



ATTENTION

The following Special Contract Requirements (SCRs) are only a portion of the specifications for this project. These SCRs amend and supplement the Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, FP-14. The FP-14 is a separately published book. In order to understand the solicitation properly you need to have the FP-14 as well as this packet. Pay particular attention to the provisions of Subsection 104.04 in the FP-14 that explains how each of the many contract documents fit together.

One printed copy of the FP-14 will be distributed to the successful bidder.

To view the FP-14 electronically, go to:

<https://www.fhwa.dot.gov/resources/specs/fp-14/>

A single paper copy can also be obtained from the Research & Technology Product Distribution Center (RTPDC) by e-mail report.center@dot.gov, phone 814-239-1160, or fax 814-239-2156.

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DIVISION 100 GENERAL REQUIREMENTS

Section 101. — TERMS, FORMAT, AND DEFINITIONS

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101.03 Abbreviations. Add the following to paragraph (a):

AMS-STD – Aerospace Material Specification Standard

OHWM or OHW – Ordinary High-Water Mark

SAE – Society of Automotive Engineers

101.04 Definitions. Add the following:

Holidays — Holidays occur on the following days:

- 1st day of January - New Years' Day;
- 3rd Monday of January - Martin Luther King, Jr. Day;
- 3rd Monday in February - Presidents' Day;
- Last Monday in May - Memorial Day;
- 4th day of July - Independence Day;
- 1st Monday in September - Labor Day;
- 2nd Monday in October - Columbus Day;
- 11th day in November – Veterans' Day;
- 4th Thursday in November - Thanksgiving Day;
- 25th day in December - Christmas Day;
- Other days declared holidays by the Congress or the President; and
- If a holiday occurs on a Saturday, the preceding Friday is also a legal holiday. If a holiday occurs on a Sunday, the Monday following is also a legal holiday.

In-Water Work — Work below the ordinary high-water mark (OHWM or OHW).

Pneumatic Roller — Self-propelled compaction device with smooth pneumatic tires staggered in position to provide overlap between the front and rear tires.

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**Section 102. — BID, AWARD, AND
EXECUTION OF CONTRACT**

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102.05A Contract Award. (Added Subsection).

Follow the requirements of FAR Provision 52.214-19, Contract Award - Sealed Bidding - Construction.

This contract contains options for additional work. Acceptable bids must include pricing for Base, Option X, and Option Y schedules. The base schedule will be awarded upon execution of the contract. Any exercise of Option X, Option Y, or both will be made any time from contract award date through the date specified in FAR Clause 52.217-7. (Clauses begin on page C-1.)

The apparent low bidder will be determined by the lowest bid for the total of Base, Option X plus Option Y schedules. The successful offeror will be awarded all pay items in the Base schedule. The contract amount will be the bid total for the Base schedule. If the Government exercises Option X, Option Y, or both; the contract amount will increase by the bid total for Option X schedule, Option Y schedule, or both schedules.

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Section 103. — SCOPE OF WORK

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103.01 Intent of Contract. Add the following:

Additional work on sites within or in the vicinity of the project may be requested by the CO. Such work generally will be in response to natural disasters. Provide cost proposals and perform work as ordered by the CO.

103.05 Partnering. Delete the text of this subsection and insert the following:

To facilitate this contract, the CO offers to participate in a partnership with the Contractor. This partnership draws on the strengths of each organization to identify and achieve reciprocal goals. Partnering strives to resolve problems in a timely, professional, and non-adversarial manner. If problems result in disputes, partnering encourages, but does not require, alternative dispute resolution instead of the formal claim process. The objective is effective and efficient contract performance to achieve a quality project within budget and on schedule.

Acceptance of this partnering offer by the Contractor is optional, and the partnership is bilateral.

(a) Formal partnering. If the formal partnering offer is accepted, mutually agree with the CO on the level of organizational involvement and the need for a professional to facilitate the partnering process. Engage the facilitator and other resources for key Contractor representatives and the CO to attend a partnership development and team-building workshop usually between the time of award and the Notice to Proceed. Hold additional progress meetings upon mutual agreement.

The direct cost of formal partnering facilities, professional facilitation, copying fees, and other miscellaneous costs directly related to partnering meetings will be shared by the Contractor and Government. Secure and pay for facilities, professional fees, and miscellaneous requirements. Submit invoices to the CO. The Government will reimburse the Contractor for 50 percent of the agreed costs incurred for the formal partnering process. The Government's share will not exceed \$5000.

Each party is responsible for making and paying for its own travel, lodging, and meal arrangements. No time extension for the completion of the project will be made for the use of formal partnering.

(b) Informal partnering. If the informal partnering offer is accepted, mutually agree with the CO on the timing and substance of an informal Partnering meeting.

Costs of implementing and maintaining the informal partnership are the responsibility of the party incurring the cost.

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103.06 Electronic Documentation. (Added Subsection)

After award of the contract, provide all written documents in pdf format, or an approved fixed-layout electronic format.

In addition to electronic documents, provide paper copies of the following documents and as requested by the CO:

- (a) Documents required under Section 102;
- (b) Drawings required under Subsection 104.03;
- (c) ESCP/SWPPP of Record required under Subsection 107.01A;
- (d) Weight records required under Subsection 109.03;
- (e) Receiving records required under Subsection 109.04;
- (f) Final voucher and release of claims required under Subsection 109.09;
- (g) WFLHD 470 forms required under Section 153;
- (h) Construction schedules required under Section 155; and,
- (i) Concrete batch tickets required under Subsection 552.09.

Provide documents in their native file format (the format produced by the software that the document was created in) upon request.

Physically sign documents requiring a signature, and scan the documents into an electronic format. Digital signatures, cursive fonts, or other simulated signatures will not be accepted.

Provide a resolution quality where color, text, and lines are clearly discernible. Submit each document in an individual file. Name files with a unique document name that includes the document date, document description, and project number, in the following format or as requested by the CO:

MMDDYYYY_description_project number; where: MMDDYYYY = month, day, and year.

Deliver electronic documents to the email address identified at the preconstruction conference or otherwise amended in writing by the CO. Limit the size of emailed document to 10MB. Deliver files greater than 10MB in size via portable electronic media (such as flash drive), or via Secure Large File Transfer Solution (SLFTS) at <https://slfts.fhwa.dot.gov/>. Documents delivered after 5:00 pm local time will be considered received at 7:00 am on the following business day.

The CO will reject without review any documents that are unreadable or corrupted, illegible, or include malicious content.

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Provide one paper copy of each document upon request, unless more paper copies are specified.

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Section 104. — CONTROL OF WORK

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104.03 Specifications and Drawings. Amend as follows:

Delete the first paragraph of Subsection (a) and substitute the following:

(a) General. Submittals include both documents and drawings required to construct the work. Review submittals for accuracy, completeness, and compliance with the contract. Verify submittals according to Section 153. Submittals that do not include evidence of Contractor verification may be returned for resubmission.

Submit documents in an electronic format for approval. Submit drawings in both paper and electronic format for approval. See Subsection 103.06.

Time for approval starts over when submittals are returned for revision or if additional information is requested by the CO. Do not perform work related to submitted documents or drawings before approval of the CO. Obtain written approval before changing or deviating from the approved submittals.

Delete Subsection (a)(1) and substitute the following:

(1) Documents other than drawings. Documents other than drawings include descriptive literature, illustrations, schedules, performance and test data, certifications, and similar material submitted by the Contractor to certify or explain, in detail, specific portions of the work required by the Contract. Allow 14 days for approval by the CO unless otherwise specified.

Delete the first sentence in the last paragraph of Subsection (a)(2) and substitute the following:

Submit 3 paper sets of drawings, and an electronic set of drawings with supporting calculations.

Delete Subsection (b)(2)(i) and substitute the following:

(i) Concrete box culvert, headwall, and wingwall details;

Delete Subsections (b)(2)(m) and (n) and substitute the following:

(m) Alternate retaining wall details;

(n) Details and installation procedures for proprietary wall systems;

Add the following to Subsection (b)(2):

(o) steel bridge truss type, member size, truss height shop drawings and timber plank;
and

(p) steel bridge design calculations.

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(q) micropile information identified in Section 567.04

Submit truss shop drawings for approval before fabrication.

Delete Subsection (b)(3)(d) and substitute the following:

(d) Temporary bridge structures for public use, and load ratings for temporary bridge structures for public use.

104.06 Other Contracts. (Added Subsection).

Follow the requirements of FAR Clause 52.236-8 Other Contracts.

WA NPS OLYM 11(9), Rehabilitate Route 11, Lake Crescent Road (US HWY 101).

Contact: Marty Flores, Project Engineer, FHWA. Cell: (360) 831-3540.

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Section 105. — CONTROL OF MATERIAL

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105.02 Material Sources. Amend as follows:

(a) Government-provided sources. Delete the text of this Subsection and substitute the following:

There are no Government-provided sources for this project.

(b) Government-provided material stockpile. Add the following:

There are no Government-provided material stockpiles for this project.

(c) Contractor-located sources. Delete the text of this Subsection and substitute the following:

The Contractor is responsible for Contractor-located material sources, including established commercial material sources. Use sources that fulfill the contract quantity and quality requirements. Determine the quantity, type of equipment, and work necessary to select and produce an acceptable material. Secure permits and clearances for use of the source and submit copies of the documents to the CO. Submit available historical data indicating acceptable material can be produced from the source. Perform quality control sampling and testing according to the approved Contractor Quality Control Plan in Section 153, aggregate source quality tests, and applicable Sampling, Testing, and Acceptance Requirements table included at the end of each Section. Allow the CO the opportunity to witness sampling and splitting of the test material.

Sites outside construction limits. Activities outside the construction limits that will require ground disturbance, occupation, clearing, or other environmental impacts are limited to the following; material sources, waste sites, staging areas, water sources. Provide the following documents before using these sites.

The requirements (1) through (6) below do not apply to Government designated sources or commercial sources that are established, have provided material to public and private entities on a regular basis over the last two years, have appropriate State and local permits, and do not require expansion outside their currently established and permitted area.

(1) Proposed activity description. Submit a description, schedule, and location of the proposed activities for approval by the CO. Include maps of the area and other relevant information.

(2) Cultural resources. Submit written documentation satisfactory to the CO for a recommendation of either "no historic properties affected" or "no effect" according to 36 CFR 800.4(d)(1) for historic properties on or eligible for listing to the National Register of Historic Places. Provide either:

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(a) Documentation showing there are no cultural resources present, and a recommendation of either "no historic properties affected" or "no effect" according to 36 CFR 800.4(d)(1). Documents must be prepared by an individual qualified under the Secretary of the Interiors' Standards and Guidelines for Archeology and Historic Preservation, 48 FR 44716-44740.

Documentation must be satisfactory to the State Historic Preservations Officer (SHPO) or Tribal Historic Preservations Officer (THPO) as appropriate, according to 36 CFR 800.3(c).

The CO will submit the documentation to the SHPO or THPO. Anticipate a minimum of 45 days from receipt of the documentation by the SHPO or THPO before use of the site may be approved; or

(b) Documentation showing a finding of either "no historic properties affected" or "no effect" according to 36 CFR 800.4(d)(1) has been previously obtained for the proposed activities from the State, Tribal Government or Federal Land Management Agency responsible for the land. Include attached copies of SHPO concurrence, or Memorandum of Agreement (MOA) where concurrence is not required.

(3) Species protected under the Endangered Species Act of 1973. Submit written documentation satisfactory to the CO that the proposed action will have no effect to any threatened or endangered species or their critical habitat. Provide either:

(a) A current list of all threatened or endangered species in the site of proposed activities from the U.S. Fish and Wildlife Service; and a recommendation of a "no effect" determination according to Section 7 of the Endangered Species Act prepared by a biological specialist with a minimum of 3 years of experience in Endangered Species Act compliance or other qualifications acceptable to the CO. Allow for a minimum of 45 days from submittal to the CO before use of the site may be approved; or

(b) Documentation showing the proposed activities have previously been determined to comply with the Endangered Species Act and this determination remains valid. This documentation must be from the State, Tribal Government or Federal Land Management Agency responsible for the land. Attach evidence of compliance, including correspondence with the U.S. Fish and Wildlife Service.

(4) Wetlands as defined by the U.S. Army Corps of Engineers' 1987 Wetland Delineation Manual (WDM). Submit written documentation satisfactory to the CO, that the proposed action will comply with Section 404 of the Clean Water Act, Executive Order 11990, and will not affect any wetlands. Documentation must be prepared by a wetland specialist with a minimum of 3 years of experience in wetland delineation using WDM or other qualifications acceptable to the CO.

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(5) Federal lands. Before use of sites on federal lands, submit a copy of the Letter of Approval or Special Use Permit from the applicable federal agency allowing use of the site for intended purposes.

(6) Tribal, state and local approvals. Comply with applicable laws regarding the proposed activities. Submit copies of required clearances, including hazardous waste compliance, tribal, State and local permits and approvals.

Allow 12 days (in addition to other agency time requirements) for approval of documents submitted to the CO.

Weed free certification. Provide materials free of noxious weeds. The term “noxious weed” includes all plant species that have been declared noxious in the jurisdiction (Federal, state, and county) where the material source is located, but also includes all plant species on the Washington State Noxious Weed List and Clallam County Noxious Weed List. Use one of following the methods, (a) or (b) to show compliance with this requirement:

(a) Provide noxious weed-free certification for all imported aggregate, borrow, bedding material, riprap and erosion control materials that are capable of harboring noxious weed seed. Noxious weed-free certification must meet or exceed the North American Weed Management Association (NAWMA) standards (<http://www.nawma.org/>). These standards include that all components be inspected in the State/Province of origin by proper officials or authority (described below). For a material source provider to be considered certified noxious weed-free, all staging areas, work areas and facilities associated with producing the material must be inspected by a qualified Government inspector, or other proper officials or authority (described below), and determined to be free of all noxious weeds.

(1) Inspection and certification shall meet the North America Weed Management Association (NAWMA) standards.

(2) Proper official/authority to perform the inspections is:

(a) National Park Service (NPS) representative designated by Olympic National Park. May be referred to as the “NPS Representative,” “the Park” or “the NPS”, hereafter. To request an inspection by the NPS, submit request to the CO and allow up to seven working days for NPS inspection;

(b) Representative of that State’s Department of Agriculture;

(c) County weed supervisor, county weed inspector, county weed superintendent and/or county weed coordinator;

(d) University Extension Agent; or

(e) An individual designated by that State’s law or regulation. This individual will be trained and certified in accordance with the State’s standard operating procedures.

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Submit material certifications to the CO for approval at least 5 days prior to their use in the work.

(b) If the sources cannot be cleared as noxious weed free the following criteria must be met:

(1) Mine all material from a location within the material source that has virgin material that has been exposed less than 5 days or;

(2) If the source pit has not been recently mined, remove the overburden to a depth of 3 feet and use newly mined material.

(c) Do not take material from stockpiles identified in (b) above that have been in place over a growing season. .

105.04 Storing and Handling Material. Delete the text of the second paragraph and substitute the following:

Use North Shore Parking Area, Lyre River Parking Area and portions of the right-of-way approved by the CO for staging or storing of materials such as culverts, geotextile fabric, temporary traffic control devices; and for equipment parking.

Provide additional space as needed. Do not use private property for staging or storage without written permission of the owner or lessee. Submit copies of agreements and documents.

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Section 106. — ACCEPTANCE OF WORK

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106.01 Conformity with Contract Requirements. Amend as follows:

Add the following to the second paragraph:

Use the modified AASHTO procedures for sampling and testing contained in the WFLHD *Supplements to Nationally Developed Standard Test Procedures*; except, when a specified sampling or test method is not included in this supplement, sample and test according to the referenced AASHTO test procedure.

Delete the third paragraph and substitute the following:

Use the FLH *Field Materials Manual (FMM)*, *Appendix B: FLH Test Methods* in effect on the date of the IFB or RFP. Electronic copies of the FLH Test Methods and FHWA forms can be downloaded from:

<https://flh.fhwa.dot.gov/resources/materials/>

Delete the fourteenth paragraph and substitute the following:

Remove, repair, or replace work that does not conform to the contract, or to prevailing industry standards where no specific contract requirements are noted. Removing, repairing, or replacing work; providing temporary traffic control; and any other related work to accomplish conformity will be at no cost to the Government.

Add the following:

Obtain copies of the following documents at:

<https://flh.fhwa.dot.gov/resources/construction/paynotes/>

- *Construction Paynote Examples*, dated August 2011.

Obtain copies of the following documents at:

<https://flh.fhwa.dot.gov/business/resources/materials/>

- Appendix B of the *Federal Lands Highway Field Materials Manual*, dated October 2008;
- WFLHD *Supplements to Nationally Developed Standard Test Procedures*;
- Standard WFLHD *Method of Test for Accelerated Weathering of Aggregate by Use of Dimethyl Sulfoxide (DMSO)*;
- Highway Research Board Bulletin No. 319, *The Humphres Method of Granular Soils*, dated 1962; and,

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- FLH Addendum to AASHTO T 308 – *Standard Method of Test for Correction Factors for Hot Mix Asphalt (HMA) Containing Recycled Asphalt Pavement (RAP) by the Ignition Method*.

106.02 Visual Inspection. Delete the text of this Subsection and substitute the following:

Acceptance is based on visual inspection of the work for compliance with the specific contract requirements. Use prevailing industry standards in the absence of specific contract requirements or tolerances.

106.03 Certification. Add the following after the second paragraph:

Obtain required certifications and maintain records of all required certifications according to Subsections 103.04, 153.04, and 155.07.

Submit a completed Form WFLHD 87 *Certification of Compliance* with each material requiring a certification. An electronic version may be found at:

<https://flh.fhwa.dot.gov/resources/construction/forms/wfl/>.

Submit all certifications to the CO unless otherwise specified in the Section ordering the work.

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Section 107. — LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

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107.01 Laws to be Observed. Delete the third paragraph and substitute the following:

Comply with the terms and conditions included in all permits and agreements obtained by the Government for performing the work included in this contract (See Section H). Notify the CO immediately of any changes, including modifications to Government-obtained permits, or any additional permits or agreements that are required by the Contractor's methods of operation. Allow adequate time in the construction schedule for any additional permits or changes to Government-obtained permits. Furnish copies of all acquired permits and agreements not in the contract.

Comply with the requirements of the Fire Protection and Suppression Plan included in this contract (See Section J).

107.01A National Pollutant Discharge Elimination System Permit (NPDES). (Added Subsection).

(a) Erosion Control Supervisor. Provide a qualified Erosion Control Supervisor according to Subsection 157.03.

(b) Preparation of the Storm Water Pollution Prevention Plan (SWPPP). Prepare a SWPPP in accordance with the requirements of the NPDES Construction General Permit (CGP) and contract requirements. The SWPPP may use information found in the Government's preliminary SWPPP listed under FAR Clause 52.236-4. Work on the SWPPP may begin before the Notice to Proceed is given. Follow the FHWA format in the SWPPP binder provided by the CO, including the narrative, maps, erosion control details and layout sheets, forms, and documentation.

(1) Complete the SWPPP narrative (tab 1) provided in the physical data or prepare a new SWPPP narrative. Include in the SWPPP narrative a statement stating that the Contractor is responsible for performing all work required in the SWPPP, including establishing measures to prevent water pollution, performing inspections, and submitting required reports.

(2) Revise or prepare new site maps (tab 5) and erosion/sediment control details and layout sheets (tab 6) as necessary to accommodate project site conditions and proposed construction operations. Include map locations and erosion and sediment control measures for all Government-provided:

(a) Staging areas;

(b) Equipment storage areas;

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(c) Erodeable stockpiles; and

(d) Other locations required by the CGP.

(3) Identify the Erosion Control Supervisor and their qualifications in the SWPPP.

(4) Submit the SWPPP to the CO. Allow 10 working days for CO approval of SWPPP. Co-sign the approved SWPPP and maintain it as the SWPPP of record for the project. Make the SWPPP available for public and regulatory-agency inspection.

(c) Notice of Intent (NOI). After the SWPPP is signed, file a NOI with the EPA as a federal operator. Use the information in the Government NOI (Appendix H) when filing the Contractor NOI.

File the NOI at the following website:

<https://www.epa.gov/npdes/electronic-notice-intent-enoi>.

Provide a copy of the NOI and EPA acknowledgement email to the CO.

Do not perform any ground disturbing activities including clearing, grubbing, or earthwork until the conclusion of the 14-day waiting period as stated in the EPA acknowledgement letter or as otherwise provided by EPA.

(d) Public Notice. Provide an aluminum sign panel to be installed in a location approved by the CO. Fabricate and mount signs according to Section 635. Post signs in a publicly accessible location. Furnish signs containing the following NPDES CGP information:

(1) The NPDES Permit tracking number.

(2) Contractor's contact name and phone number for obtaining additional information.

(3) Laminated 8.5" x 11" sheet of paper that includes the following statements:

- If you would like to obtain a copy of the Storm Water Pollution Prevention Plan (SWPPP) for this site, contact the EPA Regional Office at [include the CGP Regional Office contact information].
- If you observe indicators of storm water pollutants in the discharge or in the receiving waterbody, contact the EPA through the following website: <https://www.epa.gov/enforcement/report-environmental-violations>."

(e) Inspections. Perform SWPPP inspections as required in the CGP, Subsection 157.12, and the SWPPP. Document inspections using FHWA forms provided in the SWPPP of record and retain the records in the SWPPP binder. Submit each inspection to the CO for approval. Allow 2 working days for CO approval of inspections. Co-sign each approved inspection and file in

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the SWPPP binder. Complete all SWPPP forms as construction progresses until final acceptance

(f) Revisions to the SWPPP. Ensure that all erosion and sediment control procedures, practices, and inspections are current as required by the CGP. Revise the SWPPP as necessary during construction. Submit each revision to the CO for approval. Allow 2 working days for CO approval of a revision. Co-sign each approved SWPPP revision and file in the SWPPP binder. Implement approved revisions and corrective actions according to the timelines in the CGP.

(g) Notice of Termination (NOT). File the NOT when all conditions for terminating the permit have been met as described in CGP. Do not file the NOT without the CO's approval. If the site has not reached final stabilization at final acceptance of the project, request transfer of permit responsibility to the CO. Provide a copy of the NOT and EPA acknowledgement email to the CO.

Provide the CO with the complete SWPPP of record upon final acceptance of the project, including inspection forms, logs, and all other required documentation added during the project.

(h) Contractor selected sites. Prepare separate SWPPP and file separate NOI for all Contractor-selected sources and all waste, borrow, and staging sites not included in the contract. These SWPPP(s) and NOI(s) are solely the responsibility of the Contractor. Do not submit to CO for approval or for signature.

107.02 Protection and Restoration of Property and Landscape. Amend as follows:

Delete the third paragraph and substitute the following:

Do not disturb any area outside the construction limits unless authorized according to Subsection 105.02(c). Replace trees, shrubs, or vegetated areas outside the construction limits damaged by construction operations as directed and at no cost to the Government. Only remove damaged limbs of existing trees when directed by an approved arborist.

Add the following to the fourth paragraph:

Paleontological remains and archeological specimens found within the construction area are the property of the National Park Service and will be removed only by the National Park Service or designated representatives. Notify the CO within 1 hour of any discovery. Include a brief statement of the location and details of the finding.

107.03A Public Notice. (Added Subsection).

Publish notices of the road work in local newspapers and on local radio stations. Include a description of the work, expected delays, and periods when the road is open to traffic without

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delays. Issue the notice at least 5 days before beginning work on the project or beginning work after a winter suspension, and at least two times during the normal tourist season.

Every two weeks, provide CO information regarding construction activities for the upcoming two weeks. Include a description and timing of the work and expected trail closures or reduced access.

107.08 Sanitation, Health, and Safety. Add the following after the first paragraph:

Submit an accident prevention plan for implementing safety and health standards at the Preconstruction Conference. Use the Government furnished Form WFLHD-28, *Guide Outline of Contractor's Accident Prevention Plan*.

107.10 Environmental Protection. Amend as follows:

(c) Dirt, plant, and foreign material. Delete the text of the first paragraph and substitute the following:

All vehicles and equipment will be inspected by the CO before their initial entry into the Park for mud, weeds, and other unwanted substances. Power-wash all earth-moving equipment (including hauling vehicles) of mud and weeds before entering the Park. Subsequent entries of hauling vehicles will not require cleaning unless requested or shows signs of mud, plant material, or other substances that could harbor seeds or other plant parts. Notify the CO a minimum of 48 hours before entry to allow for inspection.

(d) Clearances for Contractor-selected, noncommercial areas. Delete this Subsection and substitute the following:

(d) Other requirements.

Comply with the following requirements:

- (1) Unnatural attractants. Keep all foods, pet foods, garbage, drinks, trash, or food and drink containers inside vehicles, or enclosed construction equipment, except during actual use. Contractor supplied garbage bins, within the construction site, will be bear proof and meet Park requirements. Remove all garbage and food trash from the project site daily.
- (2) Do not allow equipment to idle for longer than ten minutes.
- (3) All construction debris is to be hauled from the Park to a proper disposal location compliant with all local, state and Federal laws.
- (4) All tools, equipment, surplus materials, and rubbish will be removed from the project site upon project completion.
- (5) Install temporary plastic fences, according to Section 635, to protect existing trees, plants, and root zones.
- (6) Do not use hay/straw bales during construction.

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- (7) Cover all trucks hauling fill materials into the Park.
- (8) Inspect equipment each day for leaks prior to work. Conduct machinery maintenance and refueling at a distance of 150 feet or greater from any surface waters.
- (9) Do not perform construction activities during night time hours, (2 hours before sunset to 2 hours after sunrise).
- (10) Perform tree felling between September 23 and February 28. If tree felling is necessary outside this time, identify the trees to be removed and submit plan for approval at least two week prior to removal.
- (11) Instruct all workers to confine activities to within the construction limits.
- (12) Notify CO within 24 hours of locating a dead, injured, or sick endangered or threatened species (Northern spotted owl and marbled murrelet). Provide CO date, time, precise location of the injured animal or carcass, and any other pertinent information. Do not unnecessarily disturb any evidence associated with the specimen.
- (13) All fiber rolls and other erosion control products which will not be removed by the contractor at project completion must be 100% biodegradable and must not contain any plastic materials including netting or other fiber reinforcement.
- (14) Use certified weed-free mulch products with approval from the CO. Allow 7 days for approval.
- (15) Railroad spikes and short portions of rail may be found within the project limits, reset these items as directed by CO.
- (16) Use vegetable oil in place of hydraulic fluid for all heavy equipment.

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Section 108. — PROSECUTION AND PROGRESS

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108.01 Commencement, Prosecution, and Completion of Work. Add the following:

Furnish at least a 48-hour advanced notice before changing the current work schedule. Work schedule changes that include additional shifts require a 14-day advanced notice.

Perform work under this contract according to the following:

- (a) Limit work as provided for in Sections 105, 107, and 157.
- (b) Limit work as provided for in Subsection 156.07.
- (c) Complete rock scaling work in area before starting subgrade.
- (d) Complete mainline paving by the date provided for in Section 401.
- (e) Do not perform construction operations between 6:00 p.m. Friday and 6:00 a.m. the following Tuesday of the Memorial Day and Labor Day weekends.
- (f) Do not perform work between November 19 to March 15 in any year.
- (g) Close Spruce Railroad Trail to public traffic during active construction. Open Spruce Railroad Trail to public during any winter shutdown periods.

108.01A Labor. (Added Subsection).

Follow the requirements of FAR Clause 52.222-6 Construction Wage Rate Requirements.

Adjacent or virtually adjacent work sites, as used in FAR Clause 52.222-6, are defined to be work sites within ½ mile of the project. Application of Construction Wage Rate Requirements (Davis-Bacon Act) for work sites beyond ½ mile of the project will be determined by the CO.

108.02 Subcontracting. Amend as follows:

Delete the text of the first paragraph and substitute the following:

Follow the requirements of FAR clauses 52.219-4, Notice of Price Evaluation Preference for HUBZone Small Business Concerns, 52.222-11 Subcontracts (Labor Standards), and 52.236-1, Performance of Work by the Contractor.

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Delete the last paragraph and substitute the following:

Evaluate the percentage of the cost of contract performance incurred for personnel in FAR Clause 52.219-4, Notice of Price Evaluation Preference for HUBZone Small Business Concerns, according to the following formula:

$$P = H / T$$

where:

P = Percent of the cost of contract performance incurred for personnel working for HUBZone firms.

T = Total wages/benefits paid during the life of the contract. Certified payrolls will be used to determine Davis-Bacon wages and benefits paid. Submit certified statements at least monthly declaring the wages and benefits paid to non-Davis Bacon personnel under this contract.

H = Total wages/benefits paid to employees working for HUBZone firms (prime and subcontractors).

In FAR Clause 52.236-1, Performance of Work by the Contractor, the percentage of work performed on-site by the Contractor will be computed as 100 percent less the combined initial dollar amount of all subcontracts involving on-site labor as a percent of the original dollar amount of the contract.

108.03 Determination and Extension of Contract Time. Add the following to paragraph (c):

No adjustment in contract time or amount will be made for stop orders issued under Subsection 108.05(a) or (b), except an adjustment in contract time, as provided by FAR Clause 52.249-10 Default (Fixed-Price Construction), may be made when the Contractor is able to demonstrate that the weather was unusually severe based on the most recent 10 years of historical data.

108.04 Failure to Complete Work on Time. Delete this Subsection and substitute the following:

Follow the requirements of FAR Clause 52.211-12 Liquidated Damages — Construction.

Liquidated damages in the amount specified in Table 108-1 will be assessed for each calendar day beyond the time specified in the contract until substantial completion of the work.

Liquidated damages will not be assessed for the following:

(a) The day of the final inspection.

(b) Days required to perform work added to the contract after substantial completion including items identified during the final inspection that were not required before that time.

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(c) Delays by the Government after all work is complete and before a formal acceptance is executed.

(d) Periods of time when all work is complete but acceptance is delayed pending the plant establishment period or similar warranty period.

(e) During winter shutdown periods ordered by the CO.

Table 108-1
Charge for Liquidated Damages for Each Day
Work Is Not Substantially Completed

Original Contract Price		Daily Charge
From More Than —	To and Including —	
\$ 0	\$ 1,000,000	\$ 1,000
\$ 1,000,000	\$ 2,000,000	\$ 1,800
\$ 2,000,000	\$ 5,000,000	\$ 3,500
\$ 5,000,000	\$ 10,000,000	\$ 4,400
\$ 10,000,000	and more	\$ 5,200

108.05 Stop Order Delete the last paragraph.

108.06 Suspension. (Added Subsection).

Follow the requirements of FAR Clause 52.242-14 - Suspension of Work.

Suspend work, either in whole or in part, for such periods deemed necessary due to presence of marbled murrelet or spotted owl nests. See Subsection 107.10.

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Section 109. — MEASUREMENT AND PAYMENT

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109.01 Measurement of Work. Delete the text of this Subsection and substitute the following:

Take and record measurements and perform calculations to determine pay quantities for invoicing for work performed. Take or convert all measurements of work according to U.S. Customary (Metric) measure.

Unless otherwise specified, measure when the work is in-place and complete according to the contract. Measure the actual work performed, except do not measure work outside the design limits or other adjusted or specified limits (staked limits). Measure structures to the lines according to the plans or to approved lines adjusted to fit field conditions.

Take measurements as described in Subsection 109.02 unless otherwise modified by the Measurement Subsection of the Section controlling the work being performed. For individual pay items, the decimal accuracy for measurement of quantities will be determined by the CO. Decimal accuracy for measurement is one decimal beyond the accuracy of the quantity for payment.

Remeasure quantities if it has been determined that a portion of the work is acceptable, but has not been completed to the lines, grades, and dimensions shown in the plans or established by the CO.

Submit measurement notes within 24 hours of completing work that is in-place and complete according to the contract. For on-going work, submit measurement notes weekly. When work is not complete, identify the measurement as being an interim measurement. Submit the final measurement when the installation is completed. Measurement notes form the basis of the Government's receiving report; see Subsection 109.08(d). For lump sum items, submit documentation that supports invoiced progress payments each month.

Use an acceptable format for measurement notes. Include the following minimum information:

- (a) Project number and name;
- (b) Line item number, pay item number and description;
- (c) Date the work was performed;
- (d) Location of the work;
- (e) Measured quantity;
- (f) Calculations made to arrive at the quantity;
- (g) Supporting sketches and details as needed to clearly define the work performed and the quantity measured;
- (h) Names of persons measuring the work;
- (i) Identification as to whether the measurement is interim or final; and

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(j) Signed certification statement by the persons taking the measurements and performing the calculations, that the measurements and calculations are correct.

Prepare pay item measurement notes on Form FHWA 17-348 *Daily Record of Measurement and Payment*. An electronic version of the form is available at:

<https://flh.fhwa.dot.gov/resources/construction/forms/wfl/>.

109.02 Measurement Terms and Definitions. Amend the following:

Delete paragraph (o) and substitute the following:

(o) Square foot and Square yard (Square meter). 1 square yard equals 9 square feet. Measurements for area computations will be made horizontally or vertically to the surface being measured. No deductions from the area computation will be made for individual fixtures having area of 9 square feet (1 square meter) or less. Do not measure overlaps.

Add the following:

(s) Fixed hourly rate. 60 minutes. Measure the actual number of hours ordered by the CO and performed by the Contractor. Round portions of an hour up to the next half hour. Measure time exceeding 40 hours per week at the same rate as the first 40 hours.

109.06 Pricing of Adjustments. Add the following after the third paragraph:

At the preconstruction conference, furnish the following information to the CO, which will be used to price future adjustments and contract modifications.

- **Overhead.** Furnish the CO with a copy of the current certified or audited jobsite and home office overhead costs for the Contractor and Subcontractors. Provide supporting data, which justifies the costs. List costs that are included in overhead and identify the cost pool(s) to which overhead is applied.
- **Equipment.** Furnish the CO with a complete descriptive listing of equipment to be used by the Contractor and Subcontractors, including the make, model, and year of manufacturer of each piece of equipment, including attachments to the base equipment. Furnish the following cost information:
 - *Rented Equipment.* Provide current invoices to support rented or leased equipment costs.
 - *Owned Equipment.* Determine allowable ownership and operating costs for Contractor- and Subcontractor-owned equipment using actual equipment cost data determined from the operating cost records. If actual equipment cost data is not available, provide the CO with a statement signed by the highest officer or official in the company that such cost data is not available. Also provide a complete set of supporting documentation containing all ownership records that are available,

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including any purchase records, depreciation records, maintenance records, or other records that relate to the ownership and operating costs for each piece of equipment. When actual costs cannot be determined, use the rates shown in the U.S. Army Corps of Engineers Construction Equipment Ownership and Operating Expense Schedule (CEOES) for the region where costs are incurred. Adjust the rates for used equipment and for other variable parameters used in the schedules. Provide the CO with a completed WFLHD Form 103, proposed CEOES rates for each piece of equipment with supporting calculations, and any other necessary documentation about the equipment to calculate allowable ownership and operating costs using CEOES. An electronic version of the WFLHD Form 103 form is available at: <https://flh.fhwa.dot.gov/business/resources/construction/forms/wfl/>.

For equipment that is not planned to be used at the time of the preconstruction conference, but is later used on the project, provide required information and data prior to mobilizing the equipment to the project.

109.08 Progress Payments. Amend as follows:

Delete paragraph (b) and substitute the following:

(b) Closing date and invoice submittal date. The closing date for progress payments will be designated by the CO. Include work performed after the closing date in the following month's invoice. For work performed between September and July of any year, submit invoices to the designated billing office by the 7th day after the closing date. Invoices received by the designated billing office after the 16th day following the closing date, for work included in the September through July invoices, will not be accepted for payment processing that month. For work included in the August invoice, submit the invoice to the designated billing office by the 5th day after the closing date. Invoices received by the designated billing office after the 5th day following the closing date, for work included in the August invoice, will not be accepted for payment processing that month. Include late, unprocessed invoice submittals in the following month's invoice.

Delete paragraph (e) and substitute the following:

(e) Processing progress payment requests. No payment will be made for work unless field note documentation for the work was provided by the closing date.

(1) Work performed between September and July.

(a) Invoices received by the 7th day following the closing date.

(1) Proper invoices. If the invoice meets the requirements of Subsection 109.08(c), and the quantities and unit prices shown on the Contractors' invoice agree with the corresponding quantities and unit prices shown on the Governments' receiving report, the invoice will be paid.

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(2) *Defective invoices.* If the invoice does not meet the requirements of Subsection 109.08(c), or if any of the quantities or unit prices shown on the Contractors' invoice exceed the corresponding quantities and unit prices shown on the Governments' receiving report, the invoice will be deemed defective and the Contractor so notified according to FAR Clause 52.232-27(a)(2). Defective invoices will not be corrected by the Government and will be returned to the Contractor within 7 days after the Government's designated billing office receives the invoice.

Revise and resubmit returned invoices by the 18th day following the closing date. The CO will evaluate the revised invoice. If the invoice still does not meet the requirements of Subsection 109.08(c), the Contractor will be so notified according to FAR Clause 52.232-27(a)(2), and no progress payment will be made that month. Correct the deficiencies and resubmit the invoice the following month.

If the revised invoice meets the requirements of Subsection 109.08(c), but still has quantities or unit prices exceeding the corresponding quantities and unit prices shown on the Governments' receiving report, the Government's data for that item of work will be used. The Contractors' invoice, as revised by the Governments' receiving report, will be forwarded for processing by the 23rd day following the closing date. The Contractor will be notified by the 23rd day following the closing date of the reasons for any changes to the invoice.

(b) Invoices received between the 8th and 16th day following the closing date.

(1) *Proper invoices.* If the invoice meets the requirements of Subsection 109.08(c), and the quantities and unit prices shown on the Contractors' invoice agree with the corresponding quantities and unit prices shown on the COs' receiving report, the invoice will be deemed proper and forwarded for processing within 7 days of receipt.

(2) *Defective invoices.* If the invoice does not meet the requirements of Subsection 109.08(c), the invoice will be deemed defective, the Contractor so notified according to FAR Clause 52.232 27(a)(2), and no progress payment will be made that month. Correct the deficiencies and resubmit the invoice the following month.

If the invoice meets the requirements of Subsection 109.08(c), but has quantities or unit prices exceeding the corresponding quantities and unit prices shown on the Governments' receiving report, the Government's data for that item of work will be used. The Contractors' invoice, as revised by the Governments' receiving report, will be forwarded for processing within 7 days after receiving the invoice. The Contractor will be notified, within 7 days of the Government's receipt of the invoice, of the reasons for any changes to the invoice.

(2) Work performed during August.

(a) *Proper invoices.* If the invoice meets the requirements of Subsection 109.08(c), and the quantities and unit prices shown on the Contractor's invoice agree with the corresponding quantities and unit prices shown on the CO's receiving report, the invoice will be deemed proper and forwarded for processing within 7 days of receipt.

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(b) *Defective invoices.* If the invoice does not meet the requirements of Subsection 109.08(c), the invoice will be deemed defective, the Contractor so notified according to FAR Clause 52.232 27(a)(2), and no progress payment will be made that month. Correct the deficiencies and resubmit the invoice the following month.

If the invoice meets the requirements of Subsection 109.08(c), but has quantities or unit prices exceeding the corresponding quantities and unit prices shown on the Governments' receiving report, the Government's data for that item of work will be used. The Contractors' invoice, as revised by the Governments' receiving report, will be forwarded for processing within 7 days after receiving the invoice. The Contractor will be notified, within 7 days of the Government's receipt of the invoice, of the reasons for any changes to the invoice.

Delete paragraph (f) and substitute the following:

(f) Partial payments. Invoices may include the following:

(1) Progress payments may include partial payment for material to be incorporated in the work, provided the material meets the requirements of the contract and is delivered on, or near, the project site or stored in acceptable storage places.

Partial payment for material does not constitute acceptance of such material for use in completing items of work. Partial payments will not be made for living or perishable material until incorporated into the project.

(2) Partial payment for preparatory work. Partial payment for preparatory work does not constitute acceptance of work.

Individual and cumulative partial payments for preparatory work and material will not exceed the lesser of:

- 80 percent of the contract bid price for the item; or
- 100 percent of amount supported by copies of invoices submitted.

The quantity paid will not exceed the corresponding quantity estimated in the contract.

Submit pay notes according to Subsection 109.01. Provide a cost breakdown of the bid item components and submit invoices or other documents supporting the partial payment.

The CO may adjust partial payments as necessary to protect the Government.

109.09 Final Payment. Add the following after the first paragraph:

Payment for individual pay items will be based on the awarded unit price for each pay item according to the following table.

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Decimal Accuracy of Quantities for Payment

Awarded unit price	Decimal Accuracy of Quantities for Payment
< \$1.00	0 decimals
≥ \$1.00 to < \$100.00	1 decimals
≥ \$100.00 to < \$1000.00	2 decimals
≥ \$1000.00	3 decimals

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**DIVISION 150
PROJECT REQUIREMENTS**

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Section 152. — CONSTRUCTION SURVEY AND STAKING

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Description**152.01** Add the following:

Construction survey methods are defined as follows:

(a) Automated Machine Guidance (AMG) method. Grading equipment controlled with robotic total station (RTS) technology, global positioning system (GPS) technology, or a combination of the two.

(b) Conventional survey methods. All other survey methods.

Construction Requirements**152.02 Qualifications.** Add the following:

Conform to the following:

(a) Personnel. Provide a crew supervisor on the project whenever surveying and staking is in progress.

(b) Equipment. Furnish survey instruments and supporting equipment capable of achieving the specified tolerances.

Construction equipment controlled with AMG methods may be used in earthwork and the construction of subgrade; constructing subbase, base, and surface aggregate courses; or other construction operations when approved.

(c) Material. Furnish acceptable tools and supplies of the type and quality suitable for highway survey work. Furnish stakes and hubs of sufficient length to provide a solid set in the ground with sufficient surface area above ground for necessary legible and durable markings.

152.04 General. Delete the text of this Subsection and substitute the following:

Include staking activities in the construction schedule submitted according to Section 155. Include the dates and sequence of each staking activity.

At the preconstruction conference, submit a cost breakdown of the work included in the lump sum item for the purpose of making progress payments.

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(a) Government set reference lines and points. The Government has set horizontal and vertical control points for the project. The location and identity of each control point are shown on the plans.

Before beginning construction, notify the CO of any missing control points or stakes. The Government will reestablish control points and stakes missing before the beginning of construction.

(b) Government furnished information. The Government will furnish the design data described below:

- (1) Proposed horizontal alignment(s) and profile grade(s) reports in Portable Document Format (.pdf);
- (2) Cross Sections in Portable Document Format (.pdf);
- (3) Earthwork end area volume report in Portable Document Format (.pdf);
- (4) Clearing limits (based on theoretical catch points) in Portable Document Format (.pdf);
- (5) Construction staking notes containing subgrade points at centerline and shoulders, and theoretical slope stake catch points, in Comma Separated Values (.csv) and Portable Document Format (.pdf); and,
- (6) X, Y, Z coordinates of subgrade and base layer(s) points at centerline and shoulders, in Comma Separated Values (.csv) and Portable Document Format (.pdf).

Perform additional conversions and calculations as necessary for convenient use of Government-furnished data. The Contractor is responsible for the accuracy of all information converted from the Government-furnished data. Provide immediate notification of apparent errors in the furnished data.

(c) Pre-survey meeting. Before surveying or staking, discuss and coordinate the following with the CO:

- (1) Surveying and staking methods;
- (2) Stake marking;
- (3) Grade control for courses of material;
- (4) Referencing;
- (5) Structure control;
- (6) Field staking data;
- (7) Localization of the GPS systems to the Government-established control points; and

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(8) Other procedures and controls necessary for the work.

Do not start work until staking or three-dimensional (3D) verification data for the affected work has been approved.

Preserve initial reference and control points. Notify the CO of missing control points or stakes at least 10 days before beginning construction. The Government will reestablish control points and stakes missing before the beginning of construction.

Acceptance of the construction staking does not relieve the Contractor of responsibility for correcting errors discovered during the work and for bearing additional costs associated with the error.

Maintain legibility of stake markings for the duration of the project or until notified in writing the stakes are no longer needed. Replace stakes if necessary to ensure markings are maintained.

Record survey and measurement field data in an approved format. Sample note formats are available as listed in Subsection 106.01. Submit as-staked data and corrections made to the Government-furnished survey data. Submit survey and measurement data at least weekly.

The construction survey and staking work may be spot-checked for accuracy, and unacceptable portions of work may be rejected. Resurvey rejected work, and correct work that is not within the tolerances specified in Table 152-1.

Remove and dispose of flagging, paint, lath, stakes, and other staking material after the project is complete.

Compute and furnish calculations supporting pay quantities. Measure quantities within the tolerances established by the CO according to Subsection 109.01.

Payment

152.08 Delete the second paragraph and substitute the following:

Payment for lump sum items will be prorated based on the submitted cost breakdown for the work completed under this Section.

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Section 153. — CONTRACTOR QUALITY CONTROL

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Delete the text of this Section and substitute the following:

Description

153.01 This work consists of planning and implementing a construction quality process to ensure work conforms to the contract requirements. This work also includes quality control (QC) inspection and documentation, process control sampling and testing, obtaining samples for QC testing, and performing QC tests. See FAR Clause 52.246-12 Inspection of Construction.

Construction Requirements

153.02 Qualifications. Provide a QC manager (QCM) according to the following:

- (a) One year of experience managing QC on highway construction projects of similar size, type, and complexity, and
- (b) One of the following:
 - (1) Two years' experience as a construction project manager or superintendent on highway construction projects of similar size, type, and complexity;
 - (2) Three years' experience as a project engineer, resident engineer, foreman, construction inspector, or equivalent on highway construction projects of similar size, type, and complexity; or
 - (3) National Institute for Certification in Engineering Technologies (NICET) Level III certification or equivalent in highway construction or highway material.

153.03 Quality Control Plan (QCP).

(a) Personnel. Provide a QCM, on-project during work, with authority to stop non-compliant work, or work that results in non-compliance with contract requirements. Submit a letter, from a company officer or official with higher authority than the Superintendent, that authorizes the QCM to stop work.

Identify an alternate, meeting QCM qualifications, to act as QCM in the QCM's absence. Do not use an alternate as the QCM for more than three (3) days unless approved by the CO.

At least 14 days before starting work, submit names and qualifications of the QCM, any alternate, and any additional QC personnel being used on the project. Do not use QC personnel that have not been approved by the CO.

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Only the project manager, superintendent, foreman, or testing technician, may perform work as the QCM in addition to their other assigned duties.

Furnish additional QC staff (inspectors, testers, reviewers, and clerical assistants) to complete the work specified in this Section.

At the preconstruction conference, submit a cost breakdown of the individual items included in the lump sum item for use in making progress estimate payments.

(b) Development. At least 14-days before starting a work feature, develop and submit a QCP for each work feature listed below, to be approved by the CO. The absence of a plan does not relieve the Contractor of complying with the contract requirements. Additional QCPs, and/or activities, may be required to provide effective quality management. The CO may request a QCP for additional work features that are not listed below.

- (1) Control of Material (Section 105);
- (2) Construction Survey and Staking (Section 152);
- (3) Soil Erosion and Sediment Control (Section 157);
- (4) Clearing and Grubbing (Section 201);
- (5) Excavation and Embankment (Section 204);
- (6) Earthwork Geosynthetics (Section 207);
- (7) Structure Excavation and Backfill (Sections 208, 209);
- (8) Linear Grading (Section 212);
- (9) Riprap (Section 251);
- (10) Asphalt Concrete (Sections 401, 403);
- (11) Concrete, Steel, and Timber Structures (Sections 552, 553, 554, 555, 557, 563, 564);
- (12) Drainage Structures (Section 602, 604, 605, 608);
- (13) Minor Structures (Sections 609, 615);
- (14) Topsoil and Turf Establishment (Sections 624, 625);
- (15) Temporary Traffic Control (Sections 156, 635); and

Provide a QCP for each work feature in a format approved by the CO.

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Include process control sampling and testing in the QCP. Perform process control sampling and testing according to Subsection 153.05 and the QCP.

153.04 Prosecution of Work. Complete the following:

(a) Preparatory and Start-up Phase. Thoroughly address the following activities (1 through 9) for each work feature, and denote in the plan the person/position performing each activity.

(1) Review contract requirements, plans, and specifications independently and with construction supervisory staff.

(2) Check and verify that submittals, plans, and materials certifications meet contract requirements, then submit these documents at least 7 days before installation unless otherwise stated in the contract. Certify compliance by completing and signing Form WFLHD-87. An electronic version of the form is available at:

<http://flh.fhwa.dot.gov/resources/construction/forms/wfl/>.

(3) Check site conditions for constructability, including staging, disposal, and storage areas. Verify materials delivered to the site conform to accepted materials certifications, submittals, plans, and contract requirements before incorporating into the project.

(4) Review construction staking to assure it meets contract requirements, accuracy, and sufficiency for each work feature.

(5) Provide an operational work plan. Include a brief written narrative of the activities for each work feature, describing locations; crews; equipment; and proposed methods to complete work.

(6) Conduct pre-work meetings. Review contract requirements with the construction crew, foremen, and Government personnel before beginning work. Provide an overview of the operational work plan. Conduct additional pre-work meetings as necessary and when crew(s) change.

(7) Ensure construction methods will result in the end-product meeting contract requirements.

Include the following in the plan for applicable work features:

(a) The process to ensure the completed feature of work conforms to contract requirements.

(b) The inspection and testing frequency to ensure the process remains valid or work is being performed according to the established process.

(c) The action(s) to be taken and alterations to the inspection and testing frequency, if inspection or testing reveals the work is not meeting contract requirements.

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Perform corrective actions as needed to ensure work meets contract requirements.

(8) Provide immediate on-site presence to communicate status of work to FHWA and contractor personnel and for QC issue resolution.

(9) Verify completed work meets contract requirements.

Revise the QCP when personnel, activities, or processes change or when deficiencies occur in the work.

(b) Implementation. Implement QC activities as described in the accepted plan. Do not begin a work feature until the plan is approved by the CO and a pre-work meeting (activity 6) is performed. In the QC Reports described below, document when each activity (1 through 9) was performed, and by whom.

(1) QC Reports. Report the results of QC inspections that verify the work meets contract requirements as QC activities are performed. Describe the results of reviews, inspections, measurements, and testing activities. Attach original support data and test results. Document QC pre-work meetings, and discussions with the construction staff and Government personnel. Document deficiencies found in the work and describe corrective actions, adjustments to frequency of QC activities, and method or process changes to correct and eliminate future deficiencies. Provide reports to the CO daily or as otherwise approved. Include the following certification signed by the QCM:

"I certify that the information contained in this record is accurate and that work documented herein complies with the contract. Exceptions to this certification are documented as a part of this record."

(2) Notification of Completion of Work. Submit a completed "Notification of Completion of Work" (Form WFLHD 470) when the phase of work listed below is ready for inspection. An electronic version of WFLHD 470 is available at:

<http://flh.fhwa.dot.gov/resources/construction/forms/wfl/>.

Allow 1 working day for the following work to be inspected.

(a) *Survey and staking (field stakes and notes).* Provide survey notes for the following:

- (1) Control points – before disturbing original control points;
- (2) Clearing limits – before starting clearing and grubbing operations;
- (3) Slope stakes – before clearing operations or topsoil removal;
- (4) Subexcavation – after staking and prior to backfilling;
- (5) Bridge – before starting work on each component;
- (6) Walls – before starting work;
- (7) Handrail sleeve locations – before starting installation; and

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(8) Culverts – before starting installation.

(b) *Construction work.*

- (1) Erosion control devices – prior to any ground disturbing activities;
- (2) Sub grade – before placing pavement structure;
- (3) Any pavement structure layer requiring hubs – before placing next layer;
- (4) Structural excavation – before backfilling; and
- (5) Forms and reinforcing steel – before placing concrete.

The CO may request submission of a form WFLHD 470 for work not specifically listed in this subsection, or may not require a form for the listed work.

153.05 Sampling and Testing. Perform process control sampling and testing according to the *Sampling, Testing, and Acceptance Requirements* table included at the end of each Section.

Perform QC sampling and testing as defined in the QCP.

Allow the CO the opportunity to witness all sampling and/or testing. When requested, sample and split QC samples according to AASHTO or other acceptable procedures. Immediately perform splits when required. Deliver and label split QC samples according to Subsection 154.03.

Provide the following documentation:

(a) Test Results. Label test results with the same information required by Subsection 154.03. Attach work sheets, used to determine test values, to the test result forms when submitted.

(b) Control Charts. Maintain linear control charts identifying project number and name; pay item number; test number; each test parameter; upper and/or lower specification limits applicable to each test parameter; and test results. Use control charts to document process variability; identify production and equipment problems; and identify potential pay factor adjustments. Correct processes when problems exist. Post charts at the Contractor's project testing lab and on site.

153.06 Acceptance. Contractor QC will be evaluated under Subsections 106.02 and 106.04 based on the demonstrated ability of the Contractor's QC system to ensure that work meets the contract requirements.

If Government testing and inspections (quality assurance) indicate the Contractor's QC system is ineffective or the plans are not being followed; make immediate improvements to correct inadequacies. Submit written notifications of improvements and modifications to the system.

A maximum of 10 percent of the total progress payment amount will be retained and affected project work may be stopped if a QCP is not accepted, the plan is not being followed, or work does not meet contract requirements.

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Measurement

153.07 Measure the Section 153 items listed in the bid schedule according to Subsection 109.02.

Payment

153.08 The accepted quantities, measured as provided in Subsection 109.02 and above, will be paid at the contract price per unit of measurement for the Section 153 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Payment for the lump sum item will be prorated based on the submitted cost breakdown for the work completed for this Section.

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Section 154. — CONTRACTOR SAMPLING AND TESTING

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Construction Requirements

154.02 General. Add the following to the second paragraph:

Provide representative samples according to the individual Sections ordering the work.

154.03 Sampling. Add the following:

When samples are required at the Vancouver Laboratory, send to:

Material Section
Western Federal Lands Highway Division
610 East Fifth Street
Vancouver, Washington 98661

If samples are sent other than through normal delivery vendors, call 360-619-7747 or 360-619-7970 before delivery. Deliveries will be accepted from 7:00 a.m. to 2:30 p.m. PT (Monday - Friday).

Access to the Government complex is controlled; check-in is required at the main building entrance located on East Fifth Street. Directions will be given for delivery of samples.

The sampling frequencies and reporting times are listed in the Sampling, Testing, and Acceptance Requirements tables included at the end of each Section.

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Section 155. — SCHEDULES FOR CONSTRUCTION CONTRACTS

09/17/18– FP-14

Delete this Section and substitute the following:

Description

155.01 This work consists of scheduling, monitoring, and reporting all construction activities. Follow the requirements of FAR Clause 52.236-15, Schedules for Construction Contracts.

Construction Requirements

155.02 Preliminary Work Plan. Only mobilization, temporary traffic control, and Section 637 work, is allowed before a preliminary work plan is accepted.

A preliminary work plan is a written narrative of contract activities for the first 45 days after the Notice to Proceed has been issued. Include the following:

- (a) A title page stating [INSERT contract number OR task order number,] project number, project name, Contractor name, current fixed completion date, date of submittal, submittal number, and “Preliminary Work Plan”.
- (b) Describe proposed work within each activity including the type and quantity of equipment, labor, and materials to be used.
- (c) Describe planned production rates by pay item quantities (e.g. cubic yards (cubic meters) of roadway excavation per day).
- (d) Describe the number of work days per week, holidays, number of shifts per day, and number of hours per shift. Include all calendars used in the schedule module.
- (e) Estimate idle and partially-idle periods within each activity, showing start and end dates.
- (f) Describe expected and critical delivery dates for equipment or material that can affect timely completion of the project. Describe the fabrication and delivery of key and long-lead procurement activities.
- (g) Identify the Vendor, Supplier, or Subcontractor to perform an activity. State assumptions made in scheduling their work.
- (h) Describe site mobilization.
- (i) List shop drawing, sample submittals, and review times.

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Submit a preliminary work plan at least 7 days before the preconstruction conference. Within 7 days after the preconstruction conference, the preliminary work plan will be accepted or rejected. If rejected, submit a revised plan within 3 days.

155.03 Initial Construction Schedule. Prepare a construction schedule according to Subsection 155.06. Within 20 days after the Notice to Proceed has been issued; submit three paper copies, one electronic copy according to Subsection 103.06, and one electronic copy in the native file format. When discrepancies exist, paper copies govern over electronic copies of the schedule.

Show completion of work within the contract time.

Allow 10 days for approval or rejection of the schedule. If rejected, submit a revised schedule within 10 days.

If an acceptable schedule is not received within 30 days after the Notice to Proceed is issued, the CO may withhold approval of progress payments in full or in part.

155.04 Baseline Schedule. Set the approved initial construction schedule as the baseline schedule for the first updated construction schedule. Submit revisions to the baseline schedule as needed, and allow 7 days for revised baseline schedules to be approved for use. Replace the baseline schedule for construction schedule updates with the applicable, approved baseline schedule revisions.

155.05 Updated Construction Schedule. Prepare a construction schedule according to Subsection 155.06, including proposed logic and time estimate revisions if necessary. Show actual start and finish dates for activities. Verify the remaining duration of uncompleted activities.

Update the written narrative for activities in progress, and activities not started, describing schedule changes from the last submitted schedule.

Submit three paper copies, one electronic copy according to Subsection 103.06, and one electronic copy in the native file format, by the 15th day of each month, or when the following occurs:

- (a) A delay occurs in the completion of a critical (major) activity.
- (b) A delay occurs which causes a change in the critical path for the CPM schedule.
- (c) The actual prosecution of the work is different from that represented on the current construction schedule.
- (d) An addition, deletion, or revision of activities is caused by a contract modification.
- (e) There is a change in the schedule logic.

Show completion of work within the contract time.

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Project: WA NPS OLYM 2017(1), Spruce Railroad Trail Segment BWA NPS OLYM 2017(1),
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Allow 7 days for approval or rejection of the schedule. If rejected, submit a revised schedule within 7 days.

If an acceptable construction schedule update is not received by the 15th day of the month, the CO may withhold approval of progress payments in full or in part.

155.06 Construction Schedule Requirements. A construction schedule is a Critical Path Method (CPM) schedule and a written narrative. Include the following:

(a) A CPM schedule including the following:

- (1) A title page or header block with [INSERT contract number, OR task order number,] project number, project name, Contractor name, current fixed completion date, date of submittal, and submittal number.
- (2) Show activity descriptions. Relate activities or groups of activities to [INSERT contract pay items. OR task order pay items.] Include activities for submittals, submittal reviews, fabrication, and deliveries. Do not include activities for continuous, non-critical items such as flagging, traffic control, QA/QC, etc.
- (3) Show activity name or description with the activity bar on the CPM diagram.
- (4) Group activities by area (i.e., separate distinct bridges or roadways), and by type of work (i.e., submittals, utilities, roadway, bridge).
- (5) Show original and remaining durations for construction activities. Break construction activities into subtasks with no activity duration exceeding 20 working days. Break longer activities into two or more activities distinguished by location or some other description.
- (6) Show original and remaining durations of non-construction activities. Non-construction activities include: mobilization; shop drawing and sample submittals by [INSERT contract pay item number; OR task order pay item number;] and the fabrication and delivery of key materials. Non-construction activities may have durations exceeding 20 working days consistent with the contract. Indicate intended submittal dates and delivery dates for fabrication and delivery activities. Allow for review of each submittal according to the contract.
- (7) Begin the construction schedule with the date of the Notice to Proceed and conclude with a milestone that shows the planned completion date.
- (8) Show early start and finish dates.
- (9) Show late start and finish dates.
- (10) Show total float and free float.

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(11) Show relationship lines (each activity must have at least one predecessor and one successor activity, except for the Notice to Proceed and planned completion date).

(12) Use a time scale to graphically show the work scheduled for performance.

(13) Show the sequence and interdependence of all activities.

(14) Identify the critical path, which is defined as the longest sequence of activities in the schedule that determines the project duration.

(15) Show the baseline bars in the construction schedule updates.

Float is a shared commodity and is not for the exclusive use of the Contractor or the Government. Either party has the full use of float until it is depleted.

(b) A written narrative stating the basis and assumptions underlying the schedule including:

(1) Describe proposed work within each activity including the type and quantity of equipment, labor, and materials to be used.

(2) Describe planned production rates by pay item quantities (e.g. cubic yards (cubic meters) of roadway excavation per day).

(3) Describe the number of work days per week, holidays, number of shifts per day, and number of hours per shift. Describe all calendars used in the schedule module and list the calendar used for each activity in the schedule module.

(4) Estimate idle and partially-idle periods within each activity, showing start and end dates.

(5) Describe expected and critical delivery dates for equipment or material that can affect timely completion of the project.

(6) Identify the Vendor, Supplier, or Subcontractor performing an activity. State assumptions made in scheduling their work.

(7) Describe organizational limitations, such as resource constraints or subcontractor commitments, which limit scheduling flexibility.

(8) Describe site mobilization.

(9) Provide a list and description of constraints used in the CPM scheduling software.

155.07 Contractor's Daily Record of Construction Operations. For each day of work, submit a completed Form WFLHD 465 *Contractor's Daily Record of Construction Operations (CDR)* or an approved alternate form within one day of the work being performed. Report operations of work separately, with manpower and equipment assigned to each operation separately. Document

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inspection results, including deficiencies observed and corrective actions taken. Complete a CDR for each contractor and subcontractor working that day. CDR's will be approved or rejected by CO. Correct rejected CDRs and resubmit the revised CDR within 24 hours.

Certify each CDR with the following statement signed by the person responsible for the construction operation:

"I certify that the information contained in this record is accurate, and that all work documented herein complies with the requirements of the contract. Any exceptions to this certification are documented as a part of this record."

Electronic versions of the form are available at:

<http://flh.fhwa.dot.gov/resources/construction/forms/wfl/>.

155.08 Acceptance. Construction schedules and preliminary work plans will be evaluated under Subsection 106.02. CDR's will be evaluated under Subsection 106.02 and 106.03.

Measurement

155.09 Measure the Section 155 items listed in the bid schedule according to Subsection 109.02.

Payment

155.10 The accepted quantities will be paid at the contract price per unit of measurement for the Section 155 pay item listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Progress payments for construction schedule will be paid as follows:

- (a) 25 percent of the item amount, not to exceed 0.5 percent of the original contract amount, will be paid after the initial construction schedule is approved.
- (b) Payment of the remaining portion of the lump sum will be prorated based on the total work completed.

Payments made for construction schedules do not affect any rights the government may have because of failure to meet construction schedule contract requirements.

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Section 156. — PUBLIC TRAFFIC

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Construction Requirements**156.04 Accommodating Traffic During Work.** Add the following:

Delete the text of this subsection and substitute the following:

Spruce Railroad Trail may be closed to public use from Lyre River trailhead to **North Shore parking area**.

Special Contract Requirements

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Section 157. — SOIL EROSION AND SEDIMENT CONTROL

09/17/18– FP-14

Material**157.02** Add the following to the material list:

Filter Rock

705.08

Construction Requirements**157.03 Qualifications.** Delete this Subsection and substitute the following:

Provide an Erosion Control Supervisor (ECS) meeting one of the following criteria:

- (a) Alaska Certified Erosion and Sediment Control Lead (AK-CESCL);
- (b) Idaho Water Pollution Control Manager (WPCM);
- (c) Montana Department of Environmental Quality (DEQ) SWPPP Administrator;
- (d) Oregon Department of Transportation (ODOT) Certified Erosion Sediment Control Manager (ESCM);
- (e) Washington State Certified Erosion and Sediment Control Lead (CESCL);
- (f) Other State DOT-Approved Erosion and Sediment Control Certification;
- (g) Certified Professional in Erosion and Sediment Control (CPESC);
- (h) Certified Professional in Storm Water Quality (CPSWQ);
- (i) Certified Erosion, Sediment and Storm Water Inspector (CESSWI);
- (j) National Institute for Certification in Engineering Technologies (NICET) Erosion and Sediment Control Level 3 or 4; or
- (k) Certified Inspector of Sediment and Erosion Control (CISEC).

157.04 General. Delete the text of this Subsection and substitute the following:

Provide and install permanent and temporary measures to control erosion, sedimentation, and discharge of pollutants, according to the National Pollutant Discharge Elimination System (NPDES), the Construction General Permit (CGP), the project Storm Water Pollution Prevention Plan (SWPPP) of record, and this contract.

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~~Spruce Railroad Trail Segment B~~

Immediately report to the CO any incident of non-compliance with the CGP that may endanger health or the environment. Provide copies of any correspondence or reports required by either the CGP or the SWPPP.

Provide an ECS to manage installation, maintenance, inspection, and reporting for erosion and sediment control measures, maintain and update the SWPPP of record, and prepare any documentation required by the CGP or the SWPPP. Furnish the ECS's name, project office address, 24-hour telephone number(s), and qualifications at the preconstruction conference.

If wood chips are used, do not import without approval from the CO.

157.05 Controls and Limitations on Work. Delete this Subsection and substitute the following:

- (a) Install all sediment perimeter control measures prior to clearing, grubbing, and grading activities. Install additional erosion and sediment control measures as needed during construction.
- (b) Before conducting land clearing and disturbance, mark all clearing limits in the field. Mark trees, wetlands, sensitive areas, and buffer zones for preservation as shown on the plans. Preserve existing vegetation wherever possible.
- (c) Stabilize and maintain construction access points between unpaved and paved sites to minimize tracking of mud and dirt onto public roads.
- (d) Phase construction activities to minimize the amount and duration of soil exposed to erosion. Establish final grade as soon as practicable and apply temporary or permanent soil stabilization measures. Limit the combined grubbing, grading, excavating, borrow, and fill within the construction limits to 8 acres (3.2 hectares) of exposed soil at one time.
- (e) Divert runoff around exposed soils.
- (f) Commence temporary soil stabilization measures immediately if no further disturbance of an area of the site or stockpile is expected within the next 14 days. Complete temporary soil stabilization measures to disturbed sites or stockpiles within 14 days of last disturbance. Provide for temporary stabilization of all exposed soil prior to winter construction shut down.
- (g) Construct and maintain perimeter protection and locate erodible stockpiles away from storm drain inlets, waterways, and drainage channels.
- (h) Handle and dispose of all pollutants, including construction materials, waste materials, and construction debris, in a manner that does not cause contamination of storm water.
- (i) Apply fertilizers and other chemicals in a manner and at application rates that will not result in loss of chemicals to storm water runoff. Follow manufacturers label requirements except as otherwise required by the contract

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(j) Do not discharge concrete wastewater near or into waterways or wetlands. Submit proposed washout areas to the CO for approval.

157.11 Waterway and Slope Protection and Stabilization. Delete paragraph (c) and substitute the following:

(c) **Check dams.** Construct riprap, filter rock, gravel bags, sandbags, fiber rolls and socks, or earth berms for temporary check dams to reduce the velocity of runoff in ditches and swales.

157.14 Inspection and Reporting. Delete the text of this Subsection and substitute the following:

Inspect the following areas of the project:

- (a) All areas where soil has been disturbed and that have not been permanently stabilized;
- (b) All erosion and sediment control measures and pollution prevention measures;
- (c) Government-provided material, waste, borrow, staging and maintenance areas;
- (d) All areas where storm water typically flows within the site;
- (e) All points of storm water discharge from the site; and
- (f) All locations where temporary stabilization measures have been implemented.

Inspect all erosion and sediment control measures at least once every 7 days, and within 24 hours of a storm event of 0.25 inches (6 millimeters) or greater as determined by an on-site rain gauge. Specify in the project SWPPP (tab 9) which inspection schedule will be used and use the same schedule throughout the duration of construction.

Furnish completed inspection reports to the CO within 24-hours after performing an inspection.

When construction is suspended for seasonally-frozen conditions, inspections may be suspended (temporarily) if disturbed areas are stabilized. When inspection frequencies are reduced, document reasons in the SWPPP (tab 9). Resume the normal inspection schedule when the construction site thaws or construction activities resume.

157.15 Maintenance and Cleanup. Delete the text of this Subsection and substitute the following:

Maintain the functionality of erosion and sediment control measures, and clean measures that are half-full of sediment, until final acceptance or until disturbed sites are stabilized according to the CO. Remove and dispose accumulated sediment according to Subsection 204.14.

Implement maintenance of erosion and sediment control devices or other corrective action within the following time requirements:

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(a) In the event of discharge of sediment or other pollutants, immediately take steps to prevent further discharge until a permanent solution is installed and made operational;

(b) Begin corrective maintenance of sediment and erosion control devices within 24 hours of discovery and complete as soon as possible.

Upon approval of the CO, remove and dispose of erosion and sediment control devices and structures according to Subsection 203.05.

157.16 Acceptance. Delete the text of the first paragraph and substitute the following:

Material for erosion and sediment control measures will be evaluated under Subsections 106.02 and 106.03. Do not provide a copy of the certifications for erosion and sediment control materials to the CO, unless otherwise directed by the CO.

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DIVISION 200 EARTHWORK

Section 201. — CLEARING AND GRUBBING

01/01/14— FP-14

Construction Requirements**201.03 General.** Add the following:

Perform felling, bucking, and decking of merchantable timber according to accepted logging practices with a minimum of breakage, damage, and waste. Saw the merchantable timber into standard log lengths with proper trim allowance.

201.04 Clearing. Add the following:

(e) Mark all trees to be delivered with ribbon using separate colors to indicate firs with root wads and all other species to be delivered. Get approval from the CO prior to cutting trees.

(f) Chip debris and non-merchantable timber into chips no larger than 6 square inches and no thicker than ½ inch to create enough chip debris mulch to cover 5,453 sqyd 4 inches deep. Stockpile, haul, and spread mulch according to Subsection 625.08. Dispose of any excess debris and non-merchantable timber according to Subsection 203.05(a).

(g) Conserve merchantable and non-merchantable timber to use as landscape logs according to Section 647.

201.05 Grubbing. Add the following:

(e) Conserve topsoil and organic material according to Subsection 204.02(c) before removing stumps.

201.06 Disposal. Delete the first sentence of this Subsection and substitute the following:

Dispose of all merchantable timber within the areas to be cleared according to Subsection 201.04 unless otherwise directed by CO.

Measurement**201.08.** Delete the second paragraph and substitute the following:

Exclude the area of any body of water or non-vegetated portions of its shoreline and adjacent trail within the clearing and grubbing limits.

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No measurement for payment will be made for additional clearing and grubbing where the horizontal and vertical alignments are shifted by the Contractor to balance quantities or suit a method of operations.

Section 204. — EXCAVATION AND EMBANKMENT

7/21/17—FP-14

Construction Requirements

204.06 Roadway Excavation. Amend as follows:

(a) Rock cuts. Delete the text of paragraph (a) and substitute the following:

Blasting rock is not allowed. Excavate rock cuts to 6 inches (150 millimeters) below subgrade within the roadbed limits. Backfill to subgrade with topping or with other suitable material. Compact the material according to Subsection 204.11.

(b) Earth Cuts. Add the following:

Excavate material suitable for backfill or other purposes in a sequence that permits the placement of the excavation directly into its final position or in stockpiles for subsequent placing.

Delete the second to last paragraph and substitute the following:

Conserve sufficient quantities of 6-inch (150-millimeter) minus material from the roadway excavation to use for finishing the roadbed. Sufficient quantities are available within the roadway excavation. Dispose of unsuitable or excess excavation material according to Subsection 204.14. Replace shortage of suitable material caused by premature disposal of roadway excavation.

204.10 Embankment Construction. Add the following to paragraph (b):

Construct the top 12 inches (300 millimeters) of the embankment with 6-inch (150-millimeter) minus material conserved from the roadway cuts.

204.13(d) Finishing. Delete this Subsection and substitute the following:

(d) Finishing. Remove material larger than 6 inches (150 millimeters) from the top 6 inches (150 millimeters) of the roadbed. Remove unsuitable material from the roadbed, and replace it with suitable material.

(1) AMG method. Finish roadbeds that are compacted according to Subsection 204.11(b) and (c) to within ± 0.05 foot (± 15 millimeters) of the design line and grade. Finish roadbeds that are compacted according to Subsection 204.11(a) to within ± 0.10 foot (± 30 millimeters) of the design line and grade. Finish ditch cross-sections to within ± 0.10 feet (± 30 millimeters) of the design line and grade. Maintain proper ditch drainage.

(2) Conventional survey method. Finish roadbeds that are compacted according to Subsection 204.11(b) and (c) to within ± 0.05 foot (± 15 millimeters) of the staked line and grade. Finish roadbeds that are compacted according to Subsection 204.11(a) to within ± 0.10 foot (± 30 millimeters) of the staked line and grade. Finish ditch cross-

sections to within ± 0.10 feet (± 30 millimeters) of the staked line and grade. Maintain proper ditch drainage.

Measurement

204.16 Add the following to paragraph (a)(1)(a) Roadway prism excavation:

Use the design volume. The design volume is defined as the bid schedule quantity less any allowance, as shown in the summary of quantities sheet of the plans. This volume is subject to adjustments resulting from changes to slope stakes according to Subsection 152.05(d).

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DIVISION 200

**DIVISION 250
SLOPE REINFORCEMENT
AND RETAINING WALLS**

Special Contract Requirements
Project: Spruce Trail Segment B

Section 255. — MECHANICALLY-STABILIZED EARTH WALLS

7/21/17–FP-14

Description

255.01 Delete the text of this Subsection and substitute the following:

This work consists of constructing welded wire rock-faced mechanically stabilized earth (MSE) walls with a geocomposite drain.

Geotextile filter and separation geotextile are designated according to Table 714-1.

Reinforcement geotextile material is designated according to Section 714.04 and Tables 714-5 and 714-6.

Material

255.02 Add the following to the material list:

Select Granular Backfill	704.08
Granular Backfill	703.03(a)
Granular Backdrain Rock	703.17
Wall Facing Gabion Rock	705.10(e) 2
Riprap	251
Plastic Pipe	708.04
Geocomposite Drain	714.02

Construction Requirements

255.03 General. Amend as follows:

Delete the first paragraph and substitute the following:

Verify limits of the wall installation. Do not disturb existing ground until the limits of wall installation have been verified.

Delete the second paragraph and substitute the following:

Perform the work under Section 209. Excavate wall foundations to within 4 inches (100 millimeters) horizontally and vertically from the staked location. Grade the foundation for a width equal to the length of reinforcing elements plus the additional width shown in the plans. Provide a smooth, uniform foundation surface free from protruding objects. Construct leveling pad as shown in the plans using select granular backfill.

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Add the following:

Install reinforcement material to within 2 inches (50 millimeters) vertically from the staked location.

Do not disturb existing ground until limits of wall installation have been verified and the CO has approved installation drawings. Furnish and install reinforcement geogrid. Install wall drainage systems including underdrain system and geocomposite sheet drains according to Section 605.

255.04 Wall Erection Amend as follows:**(b) Geogrid reinforced walls.** Delete the text of this Subsection and substitute the following:

Place and align welded wire forms at the wall face in successive horizontal lifts. Connect, tighten, and anchor soil reinforcement elements to the wall facing units before placing backfill. Do not place reinforcing elements below the corresponding connection elevations. Secure support struts as shown in the plans. Pull and anchor the reinforcement mesh taut before placing additional backfill. Do not use hardware cloth or geosynthetic material to retain backfill at the face of the wall. Provide mechanical connection using a permanent fastener according to Subsection 253.05.

Place wall-facing gabion rock behind the face of the welded wire form as shown in the plans. Place rock carefully in the forms to prevent bulging of the forms and to minimize voids in the rock fill.

Maintain the welded wire form alignment.

Lay geogrid against the wall facing with the machine direction perpendicular to the face of the wall, allowing adequate length for the wrapping at the top of the select granular backfill course. Lay non-woven separation geotextile over the geogrid to ensure final in-place positioning as shown in the plans. Overlap adjacent layers of non-woven separation geotextile a minimum of 24 inches. Do not splice geogrid. Place adjacent sheets of geogrid together without overlap. Hand-tension the geogrid to remove all wrinkles and use pins, stakes, soil piles, or the manufacturer's approved method to anchor the geogrid ahead of the backfill placement to ensure intimate contact between the geogrid and underlying material. Avoid damaging the geogrid during installation. Replace damaged material at the direction of the CO.

255.05 Backfilling. Delete the text of this Subsection and substitute the following:

Backfill the stabilized volume with select granular backfill and wall facing gabion rock according to Subsection 209.09. Place select granular backfill material from the back of wall facing fill for a width equal to the length of reinforcing elements plus the additional width shown in the plans. Ensure that no voids exist below the reinforcement. Compact each layer according to Subsection 209.10, except use an acceptable lightweight mechanical or vibratory compactor within 36 inches (900 millimeters) of the wall face. Consolidate wall facing gabion rock by rodding or other approved means to produce a uniform, tight facing fill. Where the stabilized volume supports

spread footings for bridges or other structural loads, compact the top 5 feet (1.5 meters) to at least 100 percent of the maximum density.

Ensure the non-woven separation geotextile laps over the select granular backfill without any openings that would allow the backfill to migrate past the geogrid into the wall facing gabion rock. Place adequate amount of wall facing gabion rock that would allow the geogrid confined select granular backfill to migrate in to the wall facing gabion.

Do not damage or disturb the facing or reinforcing elements. Do not operate equipment directly on top of the reinforcing elements. Correct damaged, misaligned, or distorted wall elements.

Backfill and compact behind the stabilized volume with select granular backfill material according to Subsections 209.09 and 209.10. At the end of the day's operation, slope the last lift of backfill away from the wall face to direct surface runoff away from the wall. Do not allow surface runoff from adjacent areas to enter the wall construction area.

Use gabion rock larger than the welded wire opening dimension within 18 inches (450 millimeters) of the wall face. Consolidate gabion rock by rodding or other approved means to produce a uniform, tight gabion rock mass. Place gabion rock in sequence with select granular backfill such that the top of the adjacent materials are within 6 inches (150 millimeters) of one another.

255.06 Acceptance. Amend as follows:

Delete the fifth paragraph and substitute the following:

Structure excavation and backfill material will be evaluated under Section 209.

Add the following:

Select granular backfill and granular backfill will be evaluated under Subsections 106.02 and 106.04.

Construction of welded wire rock face will be evaluated under Subsections 106.02 and 106.04.

Underdrain system and geocomposite sheet drains will be evaluated under Section 605

Wall facing gabion rock will be evaluated under Section 253.

255.07 Measurement. Delete the second sentence and substitute the following:

When measuring mechanically-stabilized earth walls by the square foot (square meter), measure the front face of wall excluding footings and leveling courses and returns.

Delete Table 255-2 and substitute the following:

Table 255-2
Sampling, Testing, and Acceptance Requirements

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time	Remarks
Source									
Select granular backfill - 704.08	Measured and tested for conformance (106.04 & 105)	Gradation	—	AASHTO T 27 & T 11	1 per soil type	Source of material	Yes	Before using in work	Not required when using Government-provided source
		LA abrasion	—	AASHTO T 96	"	"	"	"	"
		Angle of internal friction	—	AASHTO T 236 and Subsection 704.08(a)(2)	"	"	"	"	"
		Soundness using sodium sulfate	—	AASHTO T 104	"	"	"	"	"
		Plasticity index	—	AASHTO R 58, T 89, & T 90	"	"	"	"	"
		Resistivity ⁽¹⁾	—	AASHTO T 288	"	"	"	"	"
		pH ⁽¹⁾⁽²⁾	—	AASHTO T 289	"	"	"	"	"
		Sulfate content ⁽¹⁾⁽³⁾		AASHTO T 290	"	"	"	"	"
		Chloride content ⁽¹⁾⁽³⁾	—	AASHTO T 291	"	"	"	"	"

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Table 255-2 (continued)
Sampling, Testing, and Acceptance Requirements

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic	Category	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time	Remarks
Source									
Granular Backfill- 703.03(a)	Measured and tested for conformance (106.04 & 105)	Gradation	—	AASHTO T 27 & T 11	1 per soil type	Source of material	Yes	Before using in work	Not required when using Government-provided source
		LA abrasion	—	AASHTO T 96	“	“	“	“	“
		Apparent specific gravity	—	AASHTO T 85	“	“	“	“	“
		Absorption	—	AASHTO T 85	“	“	“	“	“
		Durability Index (course)	—	AASHTO T 210	“	“	“	“	“
Production									
Select granular backfill (704.08)	Measured and tested for conformance (106.04)	Moisture-density	—	AASHTO T 99, Method C ⁽⁴⁾	1 per soil type	Source of material	Yes	Before using in work	—
		Density	—	AASHTO T 310 or other approved procedures	2 per lift	In-place	No	Before placing next layer	—

⁽¹⁾ Required for MSE walls with metallic reinforcements.

⁽²⁾ Required for MSE walls with geosynthetic reinforcements.

⁽³⁾ Tests for sulfate and chloride content are not required when resistivity is greater than 5000 ohm centimeters.

⁽⁴⁾ Minimum of 5 points per proctor.

Section 257. — CONTRACTOR-DESIGNED RETAINING WALLS

7/21/17–FP-14

Description

257.01 Delete the text of this Subsection and substitute the following:

This work consists of designing mechanically-stabilized earth walls.

Construction Requirements

257.05 Design and Construction. Delete the text of this Subsection and substitute the following:

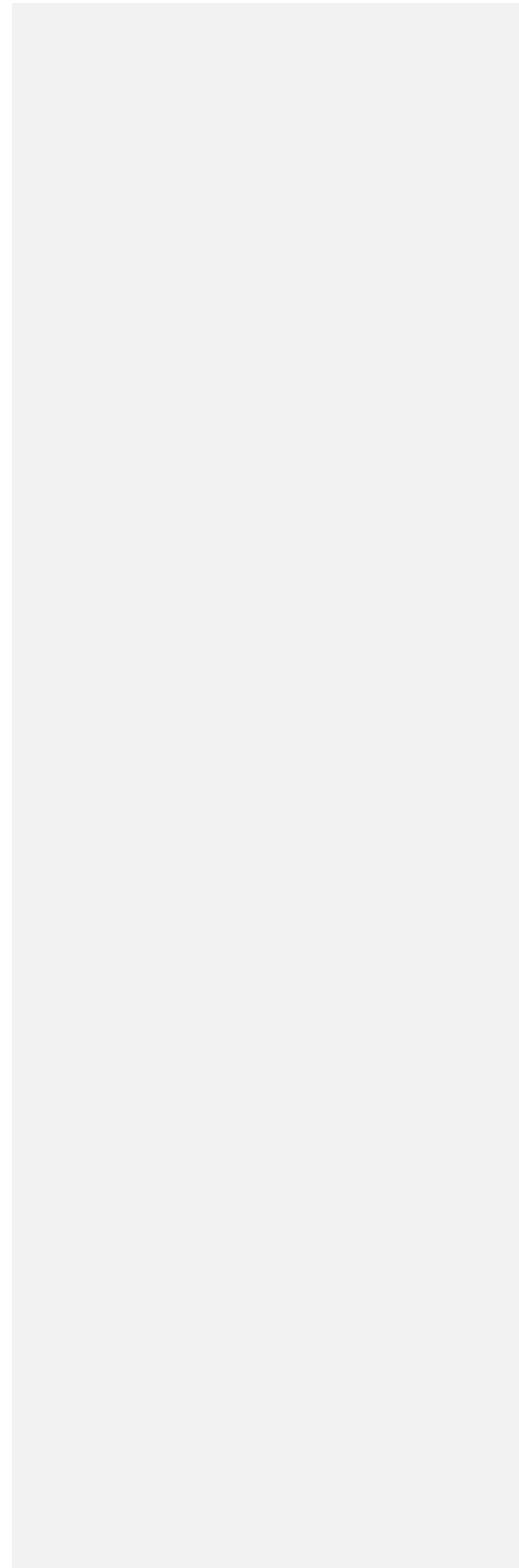
Design and construct the wall according to the approved drawings, referenced design procedures, and the following Sections as applicable:

- (a) **Mechanically-stabilized earth walls.** Design mechanically stabilized earth walls according to the AASHTO LRFD Bridge Design Specifications. Construct mechanically stabilized earth walls according to Section 255.

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DIVISION 200

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Delete Section 260 and substitute the following:

Section 260. — ROCK BOLTS AND DOWELS

Description

260.01 This work consists of furnishing and installing rock bolts (exterior), rock dowels (exterior), rock and dowels (transition), and rock dowels (interior).

- (a) Rock bolts are post tensioned, fully grouted deformed steel bars that actively reinforce a rock mass.
- (b) Rock dowels are un-tensioned, fully grouted deformed steel bars that passively reinforce the rock mass.
- (c) Rock dowels (interior) are specifically for interior support of the tunnel and anchorage of wire mesh used for drainage inside the tunnel.

Materials

260.02 Materials. Conform to the following Section and Subsections:

Rock bolts and rock dowels	722.03
Water	725.01(a)
Nonshrink grout	725.13(b)
Rock Bolt Bond Breakers	725.20

Construction Requirements

260.03 Qualifications. Use a contractor with at least 2 years of experience installing rock bolts and dowels according to these contract requirements. Provide an on-site drill foreman and drill operator(s) with experience installing and testing rock bolts and dowels. Submit the following to the CO at least 14 days before starting work. Workers not approved by the CO cannot perform work on the project:

- (a) Provide a list of projects showing the contractor's work experience. For each project, list project owner information including name, title, and current contact information.
- (b) Provide resumes for the drill foreman and each drill operator(s) with the following:
 - (1) Project owner information, including name, title, and current contact information for each project work experience referenced.
 - (2) Five projects over the past 5 years that the drill foreman has completed safely and satisfactorily with at least 3000 linear feet of rock bolts and dowels installed according to these contract requirements.

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(3) Three projects over the past 5 years that each drill operator has completed safely and satisfactorily with at least 1000 linear feet of rock bolts and dowels installed according to these contract requirements.

260.04 Submittals. In accordance with Subsection 104.03, submit the following at least 21 days before starting rock bolt and dowel installations. Do not start this work until the CO approves these documents in writing.

(a) Proposed construction sequence and schedule.

(b) Proposed drilling methods and equipment, including catalog cuts, brochures, or other descriptive literature describing the equipment to be used for drilling holes and equipment to be used for handling, installing, and grouting the rock bolts and dowels. Include drill rod sizes and bit diameters.

(c) Proposed method to access the rock bolt and dowel locations with the drill equipment.

(d) Proposed drill hole diameter and the minimum bond zone length for design loads of 25,000 pound (25 kips) and 50,000 pounds (50 kips), respectively, for rock bolts (exterior), rock dowels (exterior), rock bolts (transition), and rock dowels (transition). Design minimum bond zone lengths according to the most recent published guidance provided in the Post Tensioning Institute (PTI) publication entitled, *Recommendations for Prestressed Rock and Soil Anchors*.

Commented [AH1]: It seems unusual to us to leave this up to the contractor.

(e) Proposed rock bolt and dowel type, couplers, bearing plate, washers (flat and beveled), nut, stressing anchorages, centralizers, and bond breakers (if applicable) with specifications including manufacture's data sheets, catalog cuts and mill certificates. Include manufacturer's verification for the bearing plate thickness for the specified rock bolt and dowel design loads. Include a detailed description of bolt and dowel assembly and installation procedures and sequence.

(f) Manufacturer recommendations for bar and hardware handling, storing, and working temperature ranges. Details of storage facilities that will be used to protect rock bolts and rock bolt components against damage and maintain the rock bolts and components at proper temperatures during extreme weather conditions.

(g) Nonshrink cement grout type, mix design, 3-day compressive strength test results (minimum 3-day compressive strength of 2,500 psi), a description of how the proportions of grout ingredients will be measured in the field, placement procedures, manufacturer's data sheets and catalog cuts, and mixing equipment for the two options listed for non-shrink cement grouting.

(1) Two-stage grouting. Means for determining the level of primary (first-stage) grout in the hole; and

(2) Single-stage grouting. Fabrication details for proposed bond breaker in the free stressing zone including corrosion inhibiting compounds, when applicable.

(h) Manufacturer certification and statement of manufacturer's compliance for corrosion-resistant bar coating along with procedures and material for repairing corrosion protection on bars in the field.

(i) Methods, equipment, and materials used to control excessive grout injection volumes when open joints, seams, or loose material is encountered.

(j) Details for placing, stressing, and testing rock bolts and dowels. Schedule of a test installation to demonstrate rock bolt or dowel installation, testing equipment, and procedures. The proposed rock bolt stressing equipment, setup, and procedures that will be used for the performance and proof testing.

(k) If required, a detailed procedure for placing the anchor head assembly (bearing plate and nut) during stressing and grouting and once the grout has set and the head assembly is removed.

(l) Special installation methods (such as upwardly inclined rock bolts and dowels, techniques for constructing bearing pads, grouting across open joints and debris-filled discontinuities that will be used to ensure a fully-grouted, well-protected installation) when applicable.

(m) Identification number and calibration test certification for each jack, pressure gauge, and electronic load cell to be used for testing. Clearly indicate the serial number of each component of the testing assembly on calibration graphs. Submit results from calibration tests conducted by an independent testing laboratory within the previous 60 days.

(n) Report documentation examples including installation and testing report formats.

(o) Calibration data, including a graph of torque versus tension for each torque wrench to be used. Calibrate Ttorque wrenches shall have been calibrated within the 30 calendar days prior to the start of work at the site.

(p) Develop and submit a logical numbering system to identify all planned rock bolts and dowels.

260.05 Safety. Provide work site safety and perform work to protect workers, equipment, and the travelling public from hazardous, and potentially hazardous conditions. Provide temporary support of rock blocks, and implement special designs or installation procedures as needed to safely install rock bolts and dowels. Safety-related submittals are for information only. Review by the CO shall in no way relieves Contractor from sole responsibility for site safety.

260.06 Rock Bolt and Dowel Fabrication.

(a) **General.** Fabricate rock bolts and dowels per PTI, *Recommendations for Prestressed Rock and Soil Anchors*. Provide Rock bolt and rock dowel threadbar and appurtenant hardware shall be that are a standard product of a company regularly engaged in their manufacture. Deliver rock bolts and dowels to the job site in bulk lengths and field cut to the appropriate lengths after drilling for each rock bolt and dowel. Do not precut rock bolts and dowel steel tendons at the factory. Size tendons to ensure:

(1) The design load does not exceed 60 percent of minimum ultimate tensile strength of the bar; and

(2) The maximum test load does not exceed 80 percent of the minimum ultimate tensile strength of the bar.

Provide Each rock dowel (interior) shall consist of a single epoxy-coated steel threadbar, centralizers, bearing plate, washer, and hex nut. Provide Steel threadbar for rock dowels (interior) conforming to ASTM A615 Grade 75 shall be with nominal 1-inch-diameter (#8 bar) conforming to ASTM A615 Grade 75, and shall have a continuous hot rolled pattern of threadlike deformations along its entire length. Provide Tthreadbar for rock dowels (interior) shall be as epoxy-coated in accordance with ASTM A775.

(b) Couplers. Couple only fully-grouted anchors capable of developing 100 percent of the minimum ultimate strength of the bar/tendon. Couple sections together only when the design length exceeds the standard commercially available bar lengths. Use couplers with a center stop to ensure equal length of thread connects each section. Do not use couplings that interfere with the flow of grout.

(c) Anchorage. For the stressing anchorage, use a steel bearing plate, washers (flat hardened, beveled or spherical, as required), and a nut capable of developing 100 percent of the minimum ultimate tensile strength of the tendon. Install Steel bearing plates shall conform to ASTM A36/A 36M and shall meet load and deflection criteria of ASTM F432 and shall have a hole drilled and sized to allow at least a 15 degree skew of the bar from normal to the plate in all directions. Wwashers shall ensure that there is a continuous load transfer between the tightened hex nut and the bearing plate. For rock dowels (interior), size nuts shall be sized to fit over the epoxy-coated threadbar without damaging the coating.

(d) Centralizers. For cement grouted rock bolts and dowels, place centralizers along the tendon at 10-foot centers, with at least one two centralizers per rock bolt or dowel. Locate the lowermost centralizer within 12 inches of the end. Use centralizers of sufficient strength to support the tendon bar in the drilled hole and provide a minimum of 0.5 inches of grout cover around it. Centralizers shall be plastic or other approved material which is non detrimental to the Grade 75 steel. Wood shall not be used. Allow Ccentralizers shall permit grout to freely flow up the drill hole.

260.07 Delivery, Handling and Storing Material. Handle and store tendons according to ASTM A767 guidelines, manufacturer's recommendations, and Subsection 256.06. Replace bars with damage to corrosion protection coatings.

Submit mill reports and a certificate from the manufacturer stating chemical properties, ultimate strength, yield strength, modulus of elasticity, for each heat or lot of steel delivered to the site. This requirement applies to the rock bolt and dowel bars, anchorage hardware, and couplers. The use of secondary steel shall not be permitted for the rock dowel bars, anchorage hardware, or couplers.

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Submit Written certification for the epoxy coating material, along with the manufacturer's recommended product for field touch-up of bars and cut ends shall be submitted with the delivery of the rock dowel (interior) bars.

Suitably wrap, package, or cover Materials shall be suitably wrapped, packaged or covered at the factory or shop to prevent being affected by dirt, water, oil, grease, and rust.

Handle, transport, and store hardware material according to the manufacturer's recommendations to protect finishes from abrasions that remove the staining product.

Place Materials stored at the site shall be placed on a well-supported platform and covered with plastic or other approved material. Protect Materials shall be protected from adjacent construction operations.

Repair minor damages to galvanized and weathered surfaces, according to Section 563.

Remove Steel damaged by abrasion, cuts, nicks, heavy corrosions, pitting, welds or weld spatter shall be rejected and removed from the site.

260.08 Installation. Remove vegetation, perform safety scaling, and prepare sites as needed for construction access and installing rock bolts and dowels.

Dispose of removed vegetation according to Subsection 201.06.

Do not start work for rock bolts and dowels until work under Section 623 is completed and accepted by the CO in each slope (US) section.

Treat all exposed steel bars and appurtenances with stain according to Section 563, except for rock dowels (interior).

Furnish and install rock bolts with a minimum design load of 25,000 pounds (25 kips) and 50,000 pounds (50 kips). Furnish and install rock dowels (exterior and transition) with a minimum design capacity of 25,000 pounds (25 kips). Furnish and install rock dowels (interior) with a minimum design capacity of 47,000 pounds (47 kips). Select and construct rock bolts and dowels to carry the specified loads and supply all access, materials, equipment, and labor necessary to install the rock bolts and dowels as specified in the Plans.

Installation of rock dowels (interior) shall be in accordance with the recommendations of PTI and the manufacturer. When such recommendations differ from the requirements of this specification, request clarification from the CO before proceeding. Provide Aa technical representative from the rock dowel manufacturer shall be available to answer questions and assist with solving problems related to installation.

All the equipment used in handling and placing the rock bolts and dowels shall be such that it does not damage the steel or corrosion protection coating with all the equipment used in handling and placing the rock bolts and dowels.

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Inspect Each rock bolt and dowel shall be inspected prior to insertion into the hole. Repair Any damage to rock bolts/dowels or rock bolt/dowel heads shall be repaired prior to insertion, or, replace if determined by the Engineer to be not repairable, shall be replaced.

Install Tthe rock bolt/dowel assembly shall be installed into the hole as soon as possible after cleaning the hole with compressed air.

Do not install rock bolts in holes that have not been drilled (or which do not remain open) to the full design depth.

(a) Drilling. Provide equipment capable of drilling straight, uniform-diameter holes a minimum of 3.5-inch in diameter and up to 40 feet in length. Holes may be advanced by rotary, percussion, rotary/percussion, down-hole hammer, or using other drilling method suitable for advancing the drill tools to the depths and at the alignment specified. Do not use water or drilling slurry. Drill rock bolt and dowel holes to the minimum depths shown on the plans, and within 6 inches (150 millimeters) of the required location. Over drill the length of each hole by 6 inches. Adjust total bolt and dowel lengths as directed by the CO to address existing subsurface conditions encountered. Unless otherwise specified on the plans, or directed by the CO, drill rock bolts and dowels perpendicular to rock faces or inclined slightly downward (0 to 5 degrees) from the axis perpendicular to the rock face.

Install the rock bolt and dowel with a bearing plate oriented so the axis of the bar is within 5 degrees of being perpendicular to the bearing plate to prevent bending when bolt or dowel is tested.

Size drill hole diameters to provide at least 0.5 inches of grout cover around tendons. Drill holes for rock dowels (internal) shall be a minimum of 3.5 inches in diameter. Clean drill holes of cuttings, sludge, and debris using compressed air. Redrill holes in which bolt or dowel installation is not possible. Do not use hand drills to advance holes without written approval from the CO.

Drill Nno holes shall be drilled within 15 feet (horizontal and vertical) of a grouted hole until the grout has set at least 12 hours. The Contractor is responsible for developing a drilling sequence to comply with this requirement.

Take Ccare shall be taken while drilling to avoid damage to existing rock bolts/dowels or intact bedrock.

(b) Grouting. Install Rock dowels (interior) and grout shall be installed during the same shift in which the holes are drilled. and grouting shall take place before the end of the shift. Install all other rock bolts or dowels within 24 hours of completing drill holes. Complete first-stage grouting within one week of rock bolt and dowel installations. Tension each rock bolt after three days but after three days but within one week of completing first stage grouting. Complete second stage grouting within three days of successful post tensioning, wherever two-stage grouted rock bolts are installed.

Contractor shall provide devices capable of measuring the relative proportions of grout ingredients such that each batch of grout is consistent with the approved mix design.

The grout mixer shall be a high-speed, high-shear, colloidal type grout mixer capable of continuous mechanical mixing that will produce uniform and thoroughly mixed grout which is free of lumps and undispersed cement.

Use positive displacement grout pumps according to Subsection 256.07(b)(1).

Maintain water temperature prior to mixing grout shall be between 50 and 70 degrees Fahrenheit. During periods of cold or hot temperatures, heat or cool water shall be heated or cooled before mixing grout. Follow ACI Recommendations for hot weather concreting shall be followed when the ambient air temperature is 75 degrees Fahrenheit or above. Follow ACI Recommendations for cold weather concreting shall be followed when the ambient air temperature is 40 degrees Fahrenheit or below.

Provide polyethylene tubing for grout tubes shall be polyethylene tubing or as recommended by the rock bolt/dowel manufacturer/supplier. The inside diameter of grout tubes shall be adequate for the proposed grout mix. Provide tubes shall be to be able to withstand the expected grouting pressure.

Install steel bars and grout according to the manufacturer's recommendations. Incorporate an acceptable bond breaker where rock bolts/dowels are grouted in a single stage. When grouting rock bolts in two stages, completely fill the minimum bond zone length under stage one, providing a means to verify the bond zone remains grouted, providing a means to verify the bond zone remains grouted, and fill the free-stressing (unbonded) length with grout under stage two, after successful post tensioning of the bolt. Control grout pressures to avoid ground heaving or fracturing, and fill grout tube with grout if it will remain in the hole. Apply grouting shall occur from the bottom of each hole in a manner that will prevent air voids.

Flush surplus water and diluted grout from all lines prior to injection, and replace leaky fitting before continuing grouting operations. Clean excess grout off rock surfaces, rock bolts/dowels, and bearing plates.

Quality control the production of grout by performing minimum compressive strength tests, and provide test results to the CO. For rock dowels (interior), the minimum compressive strength of two-inch grout cubes, molded, cured, and tested in accordance with ASTM C 109 shall be 1,000 psi at 24 hours, 3,000 psi at 7 days, and 6,000 psi at 28 days. Provide all testing shall be done by an independent laboratory approved by the Engineer. Testing related to the minimum compressive strength of the grout is the responsibility of the Contractor and is incidental to the contract unit price for rock bolts and dowels.

Record the quantity of injected grout and the grout pressure for each installation. Notify the CO of grout quantity overruns including the reason for the overrun and proposed actions to minimize future overruns. Obtain approval for alternative grouting methods and/or grout socks.

(c) Bearing plate installation. Maintain at least three-quarters contact of the bearing plate with the rock face. Chip out surrounding rock as necessary to provide this contact and ensure that the axis of the bar is within 5 degrees of being perpendicular to the bearing plate. A bearing

pad can be used to achieve the required contact and angle between the installed bolt or dowel and the bearing plate, or if the rock beneath the bearing plate is not sound. Allow sufficient cure time for bearing pads constructed from cement. Where necessary to achieve minimum rock face-bearing pad contact, construct bearing pads for rock bolt and dowel installations. Use Ddry-pack mortar used for bearing pad construction shall consist of one part Type I or Type I/II Portland cement, 2-½ parts sand that will pass the No. 16 (1.18 millimeter) sieve, and sufficient water to produce a mixture that will just stick together while being molded into a ball with the hands. Mortar should while not exude water but leaving the hands damp when handled. Bearing pad construction is incidental to rock bolt and dowel installation and will not be measured separately for payment.

Size the bearing plates so the bending stresses in the plate do not exceed the yield strength of the steel when a load equal to 95 percent of the minimum ultimate tensile strength of the bar is applied. Size bearing plate thickness for the specified loads and at least eight (8) inches by 8 inches square (64 square inches); (6 inches by 6 inches square (36 square inches) for rock dowels (interior)).

Use beveled washers where the tendon axis is more than 5 degrees from perpendicular to the bearing plate. Allow at least 4 inches of bolt/dowel length beyond the nut and washers. Use over-sized bearing plates as directed by the CO where rock surfaces are weak or highly weathered.

After load-testing and acceptance, tension and lock-off the rock bolts, place the second stage of non-shrink grout in the entire free stressing length, and remove excess grout from rock faces and anchorage assembly hardware.

For rock bolt and dowel installations, ensure the tendon is fully encapsulated in grout to the collar of the hole. Check grout levels through key-holes the day after grouting and fill the annulus space with grout as needed using a tremie tube. Repeat grout level checks and grout filling procedures until a fully grouted annulus space is achieved.

260.09 Rock Bolt Testing, Stressing, and Finishing. Test tensioned rock bolts and un-tensioned rock dowels per PTI, Recommendations for Prestressed Rock and Soil Anchors.

If applicable, trim the corrosion protection surrounding the free stressing length of the tendon so it does not contact the bearing plate during testing and stressing. For single stage cement grouted rock bolts, tension the tendon after the bond zone grout is set and reaches sufficient pull-out strength. For two-stage cement grouted rock bolts, tension the tendon after the bond zone grout is set and reaches sufficient pull-out strength and before the free stressing length is grouted.

(a) Performance testing. Before starting production bolting, design rock bolts and construct test bolts for each rock type according to the accepted submittal. Do not start production bolting for a rock type until the CO approves the constructed test bolt, rock bolt design, and construction methods for that rock type. Demonstrate the effectiveness of rock bolt design construction methods, and any significant changes to proposed construction methods, by conducting up to two successful performance tests in each rock type as directed by the CO. Performance tests may be required on bolts specified in the plans, or in sacrificial locations, if

reasonable access for inspection is not provided according to Subsection 106.01 and FAR Clause 52.246-12.

Use a calibrated hollow-ram hydraulic jack and gauge with graduations of 200 psi or less to tension rock bolts. Tension rock bolts to 120 percent of the design load, and maintain the tension at least 60 minutes with a maximum load tolerance of 200 psi. Apply incremental loads and record extensions under those loads with a precision tool capable of measuring to 0.001 inches. Provide all testing equipment, monitor the test, and document the results in accordance with the requirements specified in this Section. Provide rock bolt test results to the CO for further analysis. Rock bolts are acceptable if the following conditions are met:

Commented [AH2]: This could exceed 80% of yield if the design load is 60% of yield.

- (1) The total elastic movement obtained at the maximum test load exceeds 80 percent of the theoretical elastic elongation of the free stressing length;
- (2) The rock bolt will carry the maximum test load with a creep rate that does not exceed 0.04 inches between 1 minute and 10 minutes, or 0.08 inches per log cycle of time between the 6-minute and 60-minute readings; and
- (3) The CO approves submitted test results in writing.

Perform additional performance tests whenever installations fail to meet the test criteria.

(b) Proof testing. Proof test each rock bolt by tensioning bolts applying and maintaining 120 percent of the design load for 10 minutes. Rock bolts are acceptable if no loss of load occurs during the proof test. Replace failed rock bolts as directed by the CO and document the expected reasons for failure to address and rectify deficiencies in the rock bolt installation methods used for given site conditions. Adjust rock bolt installation methods as approved by the CO before installing additional rock bolts.

After rock bolts are acceptable, lower the tension and lock off the load at 100 percent of the design load with a nut and a flat/beveled washer as needed to ensure that the nut is flush against the bearing plate. Grout the remaining portion of the rock bolt within 72 hours after re-tensioning and lock off.

(c) Finishing. Trim completed rock bolt ends to within 4 inches of the rock face. Treat field cuts; repair damages to galvanization according to Section 563.08(c).

260.10 Rock Dowel (Exterior) Lift-Off Testing and Finishing. Test rock dowels per PTI, *Recommendations for Prestressed Rock and Soil Anchors*.

Test only fully grouted dowels. Conduct at least five successful lift-off tests for each different rock unit, anchor type, and proposed drilling-installation-grouting method. Gradually load lift-off test reinforcements to the design load (typically 60 percent or less of the minimum ultimate tensile strength of the dowel tendon) and monitor the pressure gauge to verify the anchor is holding the design load for at least 10 minutes. Test 5 percent of the remaining dowels if the anchors do not pull out. Replace the dowel and conduct lift-off tests on all remaining rock dowels whenever pressure gauge drops are due to anchorage movements. Apply 100 foot-pounds of torque to ensure

proper seating against the rock face. Trim completed rock dowel ends to within 4 inches of the rock face. Treat field cuts; repair damages to galvanization according to Subsection 563.08(c).

260.11 Rock Dowel (Interior) Performance Testing and Finishing. Before starting installing rock dowels (interior) for tunnel support or drainage mesh anchorage, install and performance test two sacrificial rock dowels in the tunnel interior. Install sacrificial dowels at a minimum embedded length of 10 feet and be installed at a downward angle to minimize the "bird's beak void. Grout only the bottom 5 feet of the sacrificial dowels. Provide sacrificial rock dowel (interior) installation and testing for observation by the CO.

Test cement grouted rock bolts following a period of time not less than seven days after the installation has been completed. Minimum compressive strength of the cement grout at time of testing is 3,500 psi.

(a) Testing Equipment. Provide testing equipment consisting of a hydraulic jack and hand pump of the type typically used for testing rock bolts. Include with the test apparatus a calibrated pressure gage for applying the load and a dial gage or vernier scale to measure rock bolt movement. The minimum ram travel of the stressing equipment is not less than 6 inches. Provide a pressure gage graduated in 100 psi increments. Provide the movement measuring device capable of measuring to 0.001-inch and be capable of measuring the theoretical elastic elongation of the total rock bolt length at the maximum Test Load without resetting the device, and set up on a reference frame independent from the hydraulic ram, anchor, testing apparatus, or the zone of influence of the anchor head. , and set up on an independent reference frame from the hydraulic ram, anchor, testing apparatus, or within a zone of influence of the anchor head. Provide The stressing equipment and pressure gage must have been calibrated as a unit by an independent firm no more than 30 calendar days prior to commencing Work under this contract and at six-month intervals throughout the period of use. Perform calibrations at least every three months, after rough handling of the test equipment, after damage and repair of any test equipment component, or as requested by the Engineer/CO.

(b) Performance Testing. Perform the proof test by incrementally loading the rock bolt in accordance with the following schedule. Measure the anchor movements from the alignment load and recorded to the nearest 0.001 inches with respect to an independent fixed reference point at each increment of load. The alignment load is a nominal load maintained on the anchor to keep the testing equipment in position. Monitor the test load with the pressure gauge. At load increments other than the maximum test load, hold the load just long enough to obtain the movement reading. Determine the alignment load during testing, but sufficiently seat the bearing plate to the bearing plate prior to proceeding with the performance tests.

Anchorage Test Schedule (where AL is the alignment load and DL is the design load:

AL
0.25 DL
AL
0.50 DL
AL
0.75 DL

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AL
1.00 DL
AL
1.20 DL

Hold the maximum test load (1.20 DL) for 10 minutes. Start the load-hold period as soon as the maximum test load is applied. Measure anchor movement, with respect to an independent fixed reference, at 1, 2, 3, 4, 5, 6, and 10 minutes. If the anchor movement between 1 minute and 10 minutes exceeds 0.04 inch, hold the maximum test load for an additional 50 minutes and record the movement readings at 20, 30, 40, 50, and 60 minutes, and at intermediate intervals as may be requested by the CO. Upon completion of the creep test return to the AL and record the anchor movement.

For rock dowels (interior) when the grout has reached final set per the manufacturer's recommendations or a minimum compressive strength of 60 percent of the 7-day compressive strength, install the bearing plate, washers, and nut. Tighten the nut using a calibrated torque wrench to 200 foot-pounds plus or minus 20 foot-pounds or per manufacturer's recommendations. Trim completed production rock dowel (interior) ends to within 4 inches of the rock face or one bar diameter beyond the end of the nut, whichever is longer. Treat field cuts and repair damages to the epoxy coating using manufacturer's recommended product and methods.

260.121 Drilling Logs, Test Results, and Reporting. Submit drilling logs and test results to the CO for review. Maintain daily records of rock bolt and dowel work in a manner acceptable to the CO, and include the following:

(a) As-built drawings depicting the location of each anchor on post-scaled photographs, noting anchor designation, date drilled, general drilling logs that note the drilling conditions and materials encountered, the location of any significant drilling changes (e.g. geologic contacts, voids, or open fractures), dates of all grouting operations, total anchor length, bonded length, free stressing length, grout mix, grout volume, average grout pressure, hole diameter, size of tendon, tendon inclination, and installation comments. Submit as-built drawings according to Section 104 after completing work.

(b) Performance and proof test data forms, including the anchor designation, bonded length, free stressing length, stressing length, date of stressing operation, signature of stressing operator or inspector, required elongation and associated gage pressure, actual elongation and associated gage pressure, identification numbers of jacking equipment, comments, and a table including incremental jack pressure, jack load, and movement.

260.132 Acceptance. See Table 260-1 for sampling, testing, and acceptance requirements. Material for rock bolts and dowels will be evaluated under Subsections 106.02, 106.03, and 106.04. Construction of rock bolts and dowels will be evaluated under Subsections 106.02 and

106.04. Grouting will be evaluated under Subsections 106.02 and 106.04. Installed rock bolts and dowels will be evaluated under Subsections 106.02 and 106.04.

Measurement

260.143 Measure the Section 260 items listed in the bid schedule according to Subsection 109.02 and the following as applicable. Measure the accepted performance test bolts as accepted rock bolts. Measure the accepted rock bolts and dowels by the linear foot of rock bolts and dowels installed, from the trimmed distal end of the steel tendons in the drilled hole to 6 inches beyond the slope face (12 inches beyond the slope face rock dowels (interior)).

Do not measure vegetation removal and disposal, safety scaling, and site preparation work required for construction access and installing rock bolts and dowels.

Payment

260.154 The accepted quantities will be paid at the contract price per unit of measurement for the Section 260 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05. No separate payment will be made for over-drilling holes; or for bolts and dowels that do not meet the requirements of the performance or proof testing.

Table 260-1
Sampling, Testing, and Acceptance Requirements

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic	Test Methods Specifications	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Source							
Aggregate Quality (fine) (703.1)	Measured and tested for conformance (106.04 & 105)	Quality	AASHTO M 6	1 per material type	Source of Material	Yes	Before producing
Mix Design							
Non-shrink Grout (725.13(b))	Measured and tested for conformance (106.04)	Flow	ASTM C939	1 per mix design	Source of material	Yes, when requested	Before producing
		Comprehensive Strength (3- day and 7-day)	ASTM C942	1 set from 2 separate batches of grout	Source of material	Yes, when requested	Before producing
Production							
Performance test for rock bolts	Measured and tested for conformance (106.04)	Deformation	Subsection 260.09(a)	Subsection 260.09(a)	Installation	No	Within 24 hours after completion of test
Proof test for rock bolts	Measured and tested for conformance (106.04)	Deformation	Subsection 260.09(b)	Each bolt	Installation	No	Within 24 hours after completion of test
Lift-off test for rock dowel	Measured and tested for conformance (106.04)	Deformation	Subsection 260.10	Subsection 260.10	Installation	No	Within 24 hours after completion of test
Performance test for rock dowel (interior)	Measured and tested for conformance (106.04)	Deformation	Subsection 260.11	Subsection 260.11	Installation	No	Within 24 hours after completion of test

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**DIVISION 400
ASPHALT PAVEMENTS
AND SURFACE TREATMENTS**

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DIVISION 550 BRIDGE CONSTRUCTION

Section 555. — STEEL STRUCTURES

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Description

555.01 Delete the text of this Subsection and substitute the following:

This work consists of providing a fully engineered and prefabricated steel bridge. It includes designing, furnishing, fabricating, delivering, and erecting the bridge superstructure, bridge timber deck, bearing devices, all appurtenances, timber footing sills, signs, and bridge approach embankment in accordance with the following specifications and plan drawings.

Provide a bridge manufacturer representative on site during the assembly and placement of the bridge to ensure the bridge superstructure and all of its appurtenances are properly assembled, erected and installed to provide technical guidance and support throughout the bridge superstructure operation.

Assemble, erect and install the bridge superstructure and all of its appurtenances according to the bridge manufactures' written instructions, and recommendations.

Material

555.02 Add the following:

Use steel conforming to the requirements of ASTM A588, A992, A572, or A36 for the major superstructure components (girders, diaphragms, etc.). Use fasteners and hardware consistent with the metal components being joined. See below for surface treatment requirements.

Provide pressure treated Coast Region Douglas Fir timber for the deck surface and timber footing sills. Ensure that all structural timber and lumber is seasoned and dried at the time of fabrication. Material that has become twisted, curved, or otherwise distorted prior to assembly into the final structure will be cause for rejection. Treat timber according to AWPAs Use Category System (UCS) U1. Treat to Use Category UC3B. Use Copper Naphthenate. Treat timber members according to "Best Management Practices for the Use of Treated Wood in Aquatic Environments" (BMPs) as published by Western Wood Preservers Institute (WWPI), latest edition.

Construction Requirements

555.03A Design (Added Subsection):

(a) Design Features. Perform structural design of the bridge structure and footing by or under the direct supervision of a Licensed Professional Engineer, registered in the State of

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Washington, and in accordance with recognized engineering practices and principles.

Provide a modular design that employs steel beams or hollow structural sections (HSS) as the main load carrying members. Design and fabricate the bridge such that the components may be assembled in the field with basic tools and skills. Make all field connections using high strength bolts.

Furnish all necessary bearing assemblies, anchor bolts, and connectors to fully assemble the bridge on timber sills.

Design the bridge as a Steel Truss Span. Furnish a bridge with 125 feet overall length. The minimum bridge width is 12 feet rail-to-rail.

Provide 54" railing above the floor deck. Provide Continuous vertical pickets located on the inside of the trusses. Maximum opening between pickets is 4".

Coat all steel components with shop-applied inorganic zinc primer conforming to SSPC-Paint 20, Type I, or hot dip galvanize according to ASTM A123. Completely coat all steel, including top surface of girder flanges. Use connection details for installing the decking without damaging the coating on the girders. Do not mask faying surfaces prior to painting.

Rig main superstructure components with lifting devices to facilitate efficient installation of the bridge using hand labor, light duty equipment (rubber tire backhoe). Place lifting devices so as not to interfere with traffic utilizing the structure, or make provisions to remove the lifting devices after the bridge is assembled in place.

(b) Submittal Requirements. Prepare drawings as necessary to adequately fabricate and erect the bridge. This includes, but is not limited to, bridge detail plans including girder and deck member dimensions, anchor bolt layouts, footing details, erection drawings and instructions.

Include in the General Notes the following information: design specification and method used (LRFD, LFD, ASD); assumed dead and live loads; live load deflection criteria; steel grade(s); timber grade and allowable bending stress; and any other information necessary to perform an independent structural check of the design. Furnish erection instructions including a full list of bridge components, hardware, and fasteners and an erection plan identifying pieces by piece mark and location in the structure.

For manufactured components other than rolled steel members, or sawn lumber, indicate on the drawings the relevant section properties (such as location of neutral axis, and moment of inertia or section modulus), as well as recommended maximum loading if given by the manufacturer, to allow a structural analysis of those components. This includes corrugated steel decking, if used.

Affix the seal and signature of a professional engineer proficient in bridge design in the State of Washington to the final acceptance drawings (record set) and calculations.

(c) Design Criteria. Design the bridge according to AASHTO LRFD Bridge Design Specifications, Current Edition, with Interim Specification. Use design live load according to AASHTO Guide Specifications for Design of Pedestrian Bridges. In addition, check for the

following load combinations: DL + 5000 lb live load point load; DL + 35 psf snow load. Design for maximum live load deflection of $L/500$.

For basis of footing design, the maximum allowable stress does not exceed the values listed on the plans.

555.03 Drawings and Diagrams. Add the following to (d) Transportation drawings.

Coordinate and schedule the delivery with the CO at least 14 days prior to shipping the bridge.

555.07 Fabrication. Delete the text of the first sentence of the first paragraph and substitute the following:

Fabricate the structural steel in a fabricating plant that is certified in: SBR (Certified Bridge Fabricator - Simple) under the AISC Quality Certification Program.

555.14 Preassembly of Field Connections. Add the following to the first paragraph.

Assemble the bridge at the fabrication shop prior to delivery to ensure proper fit-up of all components. Provide the CO 3 days notice prior to this action. Disassemble the bridge and transport the bridge in sections.

555.18 Erection. Delete the second sentence of the first paragraph and substitute the following:

Use steel erectors certified under the AISC Quality Certification Program. Erect steel according to category CSE (Certified Steel Erector) under the AISC Quality Certification Program.

Section 557. — TIMBER STRUCTURES

557.21 Delete the text of this Subsection and substitute the following:

Measure the Section 557 pay items listed in the bid schedule according to Subsection 109.02 and the following as applicable:

Do not measure fasteners, lags, dowels, plates, nuts, bolts or other hardware use to construct timber façade.

Section 563. — PAINTING

Description

563.01 Add the following:

This work also consists of applying galvanizing repair paint to treat or repair galvanization damages to steel materials used under Sections 260 and 651. This work also includes applying a weathering agent to repair damaged weathered surfaces, and to finish the exposed weathered steel surfaces for the materials used under Sections 260 and 651.

Material

563.02 Add the following to the material list:

Galvanizing Repair Paint	719.10
Weathering Agent	725.19

Construction Requirements

563.04 Submittals. Amend as follows:

Delete the text of paragraph (a) and substitute the following:

(a) Manufacturer's MSDS and product data sheets listing the application or use requirements, the paint, stain or weathering agent constituents, and their proportions for all cleaning, painting, and staining products.

Add the following:

- (h) Methods of protecting vehicular traffic from paints and stains applied in the field.
- (i) Provide at least 1 sample of each exposed steel component treated with the proposed weathering agent, applied by the weathering agent manufacturer's authorized contractor.
- (j) Provide project photos where the proposed weathering agent was applied to steel products. Include project and owner/agency name, and the respective contact information.

563.07(a) Surface preparation. Add the following:

(3) Prepare galvanized surfaces according to the manufacturer's recommendations before applying weathering agent.

563.07(b)(3) Application. Delete the text of the first paragraph and substitute the following:

(3) **Application.** Apply weathering agent to all exposed steel materials used in the construction of the rockfall systems according to the manufacturer's recommendations for the given application and allow the components to fully cure prior to shipment to the

project. Repair damaged weathered surfaces by applying weathering agent as needed for the damaged area to match the surrounding undamaged weathered surfaces. Finish steel and weathered steel surfaces by applying weathering agent as needed to cover shiny galvanized surfaces on steel tendons and residuals on hardware to produce oxidized surfaces that blends with the natural appearance of the surrounding terrain. Re-treat any products without adequate treatment prior to installation or scratched during installation at no cost to the government.

563.08 Structural Iron and Steel. Add the following:

(c) **Repairing galvanized surfaces.** Treat galvanized steel field cuts; and all damaged galvanizing on rock bolts, dowels, and associated hardware; with one coat of galvanizing repair paint. Perform work according to the applicable requirements of Federal Specification MIL-P-21035B and ASTM A 780.

Section 566. — SHOTCRETE**Description**

566.01 Add the following:

Comply with the requirements of ACI 506.2-13, "Specification for Shotcrete," except as specified otherwise herein. Use wet-mix type unless otherwise approved by the CO.

Material

566.02 Add the following:

Cement	701.03
Air-Entraining Admixture	711.02
Normal weight aggregate	703.16

Only use shotcrete admixtures approved by the CO. Thoroughly mix admixtures into the shotcrete at the rate specified by the manufacturer unless specified otherwise to entrain air, to reduce water-cement ratio, to retard or accelerate setting time, or to accelerate the development of strength, mixed. Provide accelerating additives compatible with the cement used, be non-corrosive to steel, and not promote other detrimental effects such as cracking or excessive shrinkage. Do not use admixtures containing chlorides.

Construction Requirements

566.04 Composition (Shotcrete Mix Design). Delete text and substitute the following:

The average compressive strength of each set of three cores extracted from test panels must be equal to or exceed 85 percent of the specified strength, with no individual core less than 75 percent of the specified compressive strength in accordance with ACI 506.2.

Provide a minimum of 8 pounds of synthetic fiber per cubic yard.

Provide a minimum Silica Fume content equivalent to 10 percent of cement by weight per cubic yard.

Provide a maximum Fly Ash content equivalent to 10 percent of cement by weight per cubic yard.

Verify mix design with trial mixes prepared from the same source proposed for use. Submit the following for approval at least 30 days before placing shotcrete:

- (a) Proposed shotcrete mix design with mix proportions and aggregate grading. When applicable, include air content, dosage, and type of admixture. Provide description and proof of conformance to project specifications for all shotcrete materials including: Portland Cement,

Silica Fume, Fly Ash, Synthetic Fibers, Aggregates, Mixture Water, and any proposed Chemical Admixtures.

(b) Representative samples of shotcrete material, if requested by the CO. Results of shotcrete preconstruction testing demonstrating compliance with Table 566-1;

(c) Proposed methods for shotcrete mixture, batching, delivery, and application. Include details of man lifts or other temporary support system for workers, proposed means for preparing surface to receive shotcrete, description of proposed curing procedures and protection to be provided to shotcrete, and details of methods for control and disposal of waste materials, including waste shotcrete, rebound and overspray.

(d) Other information necessary to verify compliance with ACI 506.2;

(e) Shotcrete material certifications;

(f) Fiber samples, if used; and

(g) Description of proposed equipment for mixing and applying shotcrete including brand name, model, and capacity of shotcrete pump and air compressor. Include the manufacturer's instructions, recommendations, literature, performance and test data. In addition, conform to the equipment requirements in ACI 506, *Guide to Shotcrete* and include the following:

(1) **Water supply system.** For dry mix, provide a job site water storage tank. Provide a positive displacement pump with a regulating valve that is accurately controlled to provide water at the required pressure and volume.

(2) **Mixing.** Use equipment capable of handling and applying shotcrete containing the specified maximum size aggregate and admixtures. Provide an air hose and blow pipe to clear dust and rebound during shotcrete application.

566.05 Hydration Stabilizing Admixtures. Delete Table 566-1 and substitute with the following:

Table 566-1⁽⁸⁾
Composition and Property Requirements of Shotcrete Mixtures

Type of Shotcrete Process	Minimum Cement Content lb/yd ³ (kg/m ³)	Maximum Water-Cementitious Material Ratio	Air Content	Minimum 3-Day Compressive Strength, f'c psi (MPa) ^{(2) (3)}	Minimum 28-Day Compressive Strength, f'c psi (MPa) ^{(2) (3)}	Maximum Boiling Absorption ⁽²⁾⁽⁴⁾ (%)	Maximum Permeable Void Volume ^{(2) (4)} (%)	Maximum Mean Core Grade ^{(2) (5) (7)}	Maximum Water-Soluble Chloride Ion (Cl ⁻) Content (% by Mass of Cement) ^{(2) (6) (7)}	Slump at Discharge into Pump (inches)
Wet (AE)	658 (390)	0.45	Grading B 6% ⁽¹⁾	1900 (13.1)	5000 (34.5)	9	17	2.5	0.15	2.5 ± 1

(1) Sample according to ASTM C1385. Measure air content on composite samples that have been acquired from material delivered to the shotcrete machine before pumping according to AASHTO T 152 or AASHTO T 196. A tolerance of ±1.5 percent is allowed. An in-place shotcrete air content of 4 percent ±1 percent is required after shooting.

(2) Prepare and cure test panels according to Subsection 566.06(a)(1). Drill 3-inch (75-millimeter) diameter cores according to Subsection 566.06(a)(2).

(3) Conduct and report compressive strength tests according to Subsection 566.06(a)(3). Calculate mean compressive core strength as the average strength of at least three individual cores, taken from the same nonreinforced test panel. Every arithmetic average of any three consecutive mean core strengths must equal or exceed 0.85 f'c with no individual core less than 0.75 f'c.

(4) Perform and report coating quality tests according to Subsection 566.06(a)(3). No individual test may be greater than the maximum specified.

(5) When shotcrete is applied over reinforcement, conduct and report core grading according to Subsection 566.06(a)(3). Calculate mean core grade as the average of at least three individual core grades, taken from the same reinforced test panel. The mean core grade must not be greater than the maximum mean core grade with no individual core grade greater than 3.

(6) When shotcrete is applied over reinforcement, perform and report water-soluble chloride ion (Cl⁻) content testing according to Subsection 566.06(a)(3). No individual test may be greater than the maximum specified.

(7) Perform during preconstruction testing only.

(8) Produce a mix with a cement to aggregate ratio, based on dry loose volumes, of not less than 1 to 3.5 for the construction and repair of concrete structures and for encasing steel members, and not less than 1 to 5 for lining ditches and channels and for paving slopes. Use a water content as low as practical so that mix is sufficiently wet to adhere properly and sufficiently dry so that it will not sag or fall from vertical or inclined surfaces or separate in horizontal work.

Delete Section 566.06 and substitute the following:

566.06 Preconstruction and Construction Testing.

(a) Field trials. Conduct preconstruction shotcrete field trials as described in subsequent sections before starting shotcrete production. Test shotcrete panels and shoot all shotcrete and panels in accordance with ACI 506.4R-94.

In addition to preconstruction field trials, furnish at least one production test panel at an orientation selected by the CO during the first application of shotcrete and henceforth for every 50 cubic yards of shotcrete placed, or for each day of shotcrete placement, whichever is more frequent.

Provide equipment, materials and personnel as necessary to obtain shotcrete cores for testing, field curing requirements, and coring. Compressive strength testing will be performed by the Contractor.

(1) Test panels. Prepare and cure test panels according to ASTM C1140. Construct steel or wood test panel forms containing no reinforcement with a minimum width and length of 24 inches (600 millimeters) and a minimum depth of 6 inches (150 millimeters) with either square or sloped sides.

When shotcrete is to be applied over reinforcement, construct additional steel or wood test panel forms containing reinforcement with a minimum width and length of 30 inches (750 millimeters) and a minimum depth of 3 inches (75 millimeters) with either square or sloped sides. Use reinforcement of the same size and spacing required for the project.

Shoot test panels using the personnel, material, equipment, operating pressures, and mix designs proposed for the project. Produce test panels for each proposed mix proportion, each anticipated shooting orientation (every 45 degrees), and each proposed nozzle operator.

As soon after shooting and is safe to prevent damage, cover and tightly wrap the panels with material conforming to ASTM C171 or store the panels in a moist room conforming to AASHTO M 201.

(2) Coring. At least 14 days after shooting, drill at least three 3-inch (75-millimeters) diameter cores from each test panel according to AASHTO T 24. Moisture condition the cores in sealed plastic bags or nonabsorbent containers according to Section 7.3 of AASHTO T 24. Deliver Government cores to the laboratory designated by the CO.

(3) Testing. At least 14 days, but no later than 28 days after shooting; perform and report coating quality tests including density, boiling absorption and volume of permeable voids according to ASTM C642. Test at least three samples from each nonreinforced test panel. Samples may consist of cores or pieces of cores or test panels that are without observable cracks, fissures, or shattered edges.

Before compressive strength testing, saw or tool the ends of the cores to eliminate projections and to achieve perpendicularity to the longitudinal axis. At 28 days after shooting, conduct and report compressive strength tests according to AASHTO T 24. Perform unconfined compressive strength tests on at least three cores from each nonreinforced test panel.

When shotcrete is applied over reinforcement, visually grade at least three cores from each reinforced test panel according to Section 1.7 of ACI 506.2 at least 14 days, but no later than

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28 days after shooting. Between 28 and 48 days, determine the maximum water-soluble chloride-ion concentration on at least three different test panel samples according to ASTM C1218.

(4) Mix design approval. Submit the test data and results as well as a visual description of each core to the CO. Include details concerning presence of voids, sand pockets, lamination, and other inadequacies. Approval of the nozzle operator and mix design will be based on preconstruction field trials and test results. The test results must meet the requirements of Table 566-1 including the following:

(a) Compressive strength tests. Calculate the mean compressive core strength of at least three individual, 3-inch (75-millimeter) diameter cores, taken from the same test panel. The mean of any three consecutive core strengths must equal or exceed 0.85 f'c with no individual core less than 0.75 f'c.

(b) Coating quality tests. Calculate density, boiling absorption, and volume of permeable voids for each test sample. No individual test may be greater than the maximum permissible values shown in Table 566-1.

(c) Core grading tests. Calculate the mean core grade from at least three individual core grades. The mean core grade must not be greater than the maximum permissible value shown in Table 566-1 with no individual core grade greater than 3. When a prequalification test panel is rejected by the CO, a second panel may be shot. If the nozzle operator's second mean core grade is greater than 2.5, that nozzle operator is not permitted to shoot shotcrete on the project. Core grading is performed during preconstruction testing only as a way of prequalifying nozzle operators.

(d) Water-soluble chloride ion concentration tests. Calculate the water-soluble chloride ion concentration for each test sample. No individual test may be greater than the maximum permissible values shown in Table 566-1. Water-soluble chloride ion analysis is performed during preconstruction testing only as a way of ensuring corrosion protection of the reinforcement.

(b) Submissions. Submit field quality control test reports with the test data and results. Include the following information in the reports:

- (1) Date and time of test panel shooting including panel dimensions, size and spacing of reinforcement, when used, and type of curing;
- (2) Test panel identification including panel number, shooting orientation, mix proportions and nozzle operator;
- (3) Date, time, method of panel coring, number of test samples obtained from each panel and sample preparation methods;
- (4) Test sample identification by panel number, sample number and sample dimensions; and
- (5) Date, time and types of tests performed.

566.07 Shotcrete Construction. Insert the following:

Deliver, store, and handle materials to prevent contamination, segregation, corrosion, or damage. Store liquid admixtures to prevent evaporation and freezing.

(a) Surface preparation. Delete text and substitute the following:

When shotcrete is to be placed over existing concrete or rock, remove loose or deteriorated material from the existing surface by chipping with pneumatic or hand tools or other methods

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approved by the CO. Remove loose or deteriorated material in such a manner as not to loosen, crack, or shatter the surfaces to receive the shotcrete. Airblast or pressure-wash the surface to remove accumulated dirt or biomaterial. Remove material that loosens as the shotcrete is applied. Do not place shotcrete on frozen surfaces. Cut shoulders approximately 1 inch (25 millimeters) deep along the perimeter of repair areas on existing concrete.

Delete the third paragraph and substitute the following::

Prior to placing shotcrete on the receiving surface, the receiving surface shall be sprayed with water to achieve a saturated surface dry condition. Bonding agents shall not be used.

Add the following:

Batch aggregate and cement by weight in accordance with the requirements of ASTM C94. Do not use volumetric batching. Provide mixing equipment capable of thoroughly mixing the materials in sufficient quantity to maintain placing continuity. Batch water and chemical admixtures to the accuracy specified in ASTM C 94 and deliver and placed within 90 minutes of batching, unless approved otherwise by CO if proper use is made of set retarder to maintain workability without addition of water.

Conform packaged shotcrete mix to the requirements of ASTM C1480. Discard packaged shotcrete mix that is exposed to humidity and forms lumps of hydrated cement.

If not included in a packaged shotcrete mix, add synthetic fibers such that they are thoroughly mixed with the wet cement to form a homogeneous mixture prior to placement as approved by the CO.

Minimum 1 inch (25 millimeters) cover over steel items including anchors, reinforcing bars and wire fabric.

(c) Temperature and weather conditions. Add the following:

Do not place shotcrete in cold weather unless adequately protected when the ambient temperature is below 40 degrees F and falling and/or when the shotcrete is likely to be subjected to freezing temperatures before reaching a minimum strength of 750 psi. Maintain cold weather protection until the strength of the in-place shotcrete is greater than 750 psi. Cold weather protection includes bondheating under tents, blankets, or other means acceptable to CO. Maintain the air in contact with shotcrete surfaces at temperatures above 32 degrees F for a minimum of 7 days.

(d) Shotcrete application. Delete the text and substitute the following:

Use the same nozzle operator that created acceptable test panels. In applying multiple shotcrete layers, bond the initial flash coat to and seal the substrate. Fill minor depressions and build up thickness with subsequent coats. Where any depressions are wide, the face of the layer may, in general, follow the contours of the depression. Multiple layers may be necessary to provide the final thickness indicated. Allow a sufficient time interval between successive applications of shotcrete to allow initial set to develop per the manufacturer's specifications.

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(1) Maintain a clean, dry, oil-free supply of compressed air sufficient for maintaining adequate nozzle velocity for all parts of the work and for simultaneous operation of a blow pipe for cleaning away rebound at all times. Provide a shotcrete pump capable of delivering the premixed material accurately, uniformly, and continuously through the deliver hose.

(2) Apply shotcrete within 45 minutes of adding cement to the mixture unless an approved hydration stabilizer is used. If a hydration stabilizer is approved, deliver and place the shotcrete within the approved design discharge time limit up to 3½ hours maximum.

(3) Limit the layer thickness of each shotcrete application to 2 inches (50 millimeters). Thicker applications may be approved if the Contractor can demonstrate that no sloughing or sagging is occurring. If additional thickness is required, broom or scarify the applied surface and allow the layer to harden. Provide a saturated surface dry condition to the surface before applying an additional layer.

(4) Remove laitance, loose material, and rebound. Apply shotcrete from the lower part of the work area upward to prevent accumulation of rebound on uncovered surfaces. Control thickness, methods of support, air pressure, and rate of placement of shotcrete to prevent sagging or sloughing of freshly applied shotcrete. Do not work rebound back into the placement nor salvage the rebound. Promptly remove rebound that does not fall clear of the working area. Hold nozzle at a distance and at an angle approximately perpendicular to the working face so that rebound will be minimal and compaction will be maximized. Rotate the nozzle steadily in a small circular pattern.

(5) Taper construction joints to a thin edge over a distance of at least 12 inches (300 millimeters). Wet the joint surface before placing additional shotcrete on the joint. Do not use square construction joints.

(6) Leave shotcrete for bedrock support with a natural gun finish, or as directed by the CO.

(6) Repair surface defects shall be repaired as soon as possible after initial placement of shotcrete. Remove all shotcrete that lacks uniformity; exhibits segregation, sagging, honeycombing, or laminating; or contains any voids or sand pockets and replace with fresh shotcrete.

Add the following:

(e) **Cleanup.** Remove all extra shotcrete, rebound, and any other materials derived from this work from the tunnel invert as directed and approved by the CO. Collect wash-out from shotcrete operation and provide a sealed containment for temporary storage/disposal of wash-out material (drums, lined pit etc.). Allow wash-out water to evaporate. Remove hardened solids and dispose at an approved facility. Recycle any remaining wash-out water (that did not evaporate) and dispose at an approved facility.

566.10 Production Report. Add the following:

(f) variations from the design mix.

Measurement

566.12 Delete the second paragraph and substitute the following:

Measure shotcrete by the square yard based on the contract quantity.

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Section 567. — MICROPILES

567.04 Submittals. Add the following:

- (o) Plan for grout control measures to minimize impact to the lake in the event of over theoretical grout.

567.05 Installation.

- (a) **Drilling.** Add the following to the first paragraph:

Temporary casing shall require if an incased hole is unstable during micropile construction.

- (b) **Casing, reinforcing bar, and splicing.** Delete second paragraph and substitute the following:

Install casing to full length. Splicing of the casing is not allowed. (c) **Grouting.** Delete Table 567-1 and substitute the following:

Table 567-1
Micropile Construction Tolerances

Micropile Attribute	Allowable Variance
Center of micropile	< 2 inches (< 75 millimeters) from indicated plan location or pile spacing
Pile-hole alignment	±2% of design alignment
Top elevation	0 to 1 inch (25 millimeters) above the design vertical elevation
Center of reinforcing steel	< 0.75 inches (< 20 millimeters) from pile center

567.06(b)(1) Verification Tests. Add the following to the first paragraph:

The CO will designate the location for one sacrificial micropile for verification testing.

567.06(b)(2) Proof tests. Replace the first sentence with the following:

The CO will designate two production micropiles for proof testing, one at each bridge abutment.

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DIVISION 600 INCIDENTAL CONSTRUCTION

Section 610. — HORIZONTAL DRAINS

Description

610.01 Delete text and substitute the following:

This work consists of constructing horizontal drains, including collector systems and installing weep holes for drainage in the tunnel interior, as indicated on the Drawings and directed by the CO.

Construction Requirements

610.03 Qualifications. Add the following to the first paragraph:

Use a contractor with at least 2 years of experience installing weep holes according to these contract requirements. Provide an on-site drill foreman and drill operator(s) with experience installing weep holes.

Add the following:

(c) Provide resumes for the drill foreman and each drill operator(s) with the following:

(1) Project owner information, including name, title, and current contact information for each project work experience referenced.

(2) Five projects over the past 5 years that the drill foreman has completed safely and satisfactorily with at least 3000 linear feet of weep holes installed according to these contract requirements.

(3) Three projects over the past 5 years that each drill operator has completed safely and satisfactorily with at least 1000 linear feet of weep holes installed according to these contract requirements.

Add the following subsection:

610.04 General. Add the following:

In accordance with Subsection 104.03, submit the following at least 14 days before starting weep hole installations. Do not start this work until the CO approves these documents in writing.

(a) Proposed weep hole construction sequence and schedule.

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(b) Proposed weep hole drilling methods and equipment, including catalog cuts, brochures, or other descriptive literature describing the equipment to be used for drilling holes. Include drill rod sizes and bit diameters.

(c) Proposed method to access the weep hole locations with the drill equipment.

(d) Proposed methods for cleaning weep holes, protecting them during shotcrete application, and reopening them after shotcrete has set.

Submit drilling logs to the CO for review. Maintain daily records of weep hole work in a manner acceptable to the CO, and include the following:

(a) As-built drawings depicting the location of each weep hole post-scaled photographs, noting hole designation, date drilled, general drilling logs that note the drilling conditions and materials encountered, the location of any significant drilling changes (e.g. geologic contacts, voids, or open fractures), total hole length, hole diameter, bearing and inclination, and any additional comments. Submit as-built drawings according to Section 104 after completing work.

Add the following subsection:

610.05 Drilling Holes. Add the following:

Provide equipment capable of drilling straight, uniform-diameter weep holes a minimum of 2-inch in diameter and up to 20 feet in length. Construct weep holes least 2 inches in diameter and not more than 4 inches in diameter. Holes may be advanced by rotary, percussion, rotary/percussion, down-hole hammer, or using other drilling method suitable for advancing the drill tools to the depths and at the alignment specified. Do not use water or drilling slurry. Drill weep holes to the minimum depths shown on the plans, and within 6 inches (150 millimeters) of the required location. Adjust weep hole lengths and locations as directed by the CO to address existing subsurface conditions encountered. Unless otherwise specified on the plans, or directed by the CO, generally drill weep holes perpendicular to rock faces, with a minimum inclination of 5 degrees upward so that water will drain freely from each hole.

No weep holes shall be drilled within 15 feet (horizontal and vertical) of a grouted hole until the grout has set at least 12 hours. Develop a drilling sequence to comply with this requirement.

Take care while drilling to avoid damage to existing rock bolts/dowels or intact bedrock.

Upon completion of drilling, clean drill holes of cuttings, sludge, and debris using compressed air.

Drill weep holes after rock dowels are installed and before shotcrete is applied. Protect weep holes during application of shotcrete and reopen them after the shotcrete has set. Do not drill weep holes through shotcrete.

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610.11 Drilling Logs, Test Results, and Reporting. Measurement**610.09** Add the following:

Measure the accepted weep holes by the linear foot as measured from the bottom of each hole to the rock face.

Payment**610.10** Add the following:

No separate payment will be made for over-drilling holes

Section 622. — RENTAL EQUIPMENT

01/01/14-FP14

Description**622.01** Delete the text of this Subsection and substitute the following:

This work consists of furnishing and operating equipment for the construction work as ordered by the CO and listed below. Work under this Section does not include equipment time used to perform work provided for under any other pay item shown in the bid schedule. The work anticipated under this Section includes:

- (a) Place felled trees/slash to cover pipe end sections;
- (b) Minor landscaping, and;
- (c) Remove and reset loose railroad rail sections.

Construction Requirements**622.02 Rental Equipment.** Delete the text of the first paragraph and substitute the following:

Furnish and operate the following equipment:

Number of Units

1

Type of Equipment

Dump Truck, 10 cubic yard
minimum capacity

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Hydraulic Excavator, crawler
mounted, 1.0 cubic yard minimum
capacity with thumb attachment

Submit the model number and serial number for each piece of equipment before use. Make equipment available for inspection and approval before use.

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Section 623. — GENERAL LABOR

01/01/14–FP14

Description

623.01 Delete the text of this Subsection and substitute the following:

This work consists of the following:

- (a) Furnishing workers and hand tools for the work listed in Subsection 622.01 in addition to work ordered by the CO and not otherwise provided for within the original contract scope.
- (b) Survey and stake the original ground within the slope scaling limits.
- (c) Slope scaling, which includes removing loose or detached blocks of rock from existing rock slopes the entire perimeter of the tunnel interior, the tunnel entrances and natural rock outcrops. Slope scaling also includes the flattening (slope regrading) of over-steepened portions of existing shallow slump features.
- (d) Vegetation removal from slope brows and rock slope faces, including the removal of trees, shrubs, and other vegetation.
- (e) Remove and dispose debris generated from the work performed under Subsections 623.01(b) and 623.01(c).

Construction Requirements

623.02A Slope Scaling General. (Added Subsection).

Survey existing boulders and rockfall debris according to Subsection 152.05(j) to obtain the original ground conditions within the slope scaling limits.

Perform general scaling within the limits shown on the plans, and as directed by the CO. Specific unstable blocks to be removed and/or areas requiring greater scaling efforts are identified in the plans as intensive scaling areas.

Remove trees and vegetation on an unstable slope before slope scaling the unstable slope; and complete slope scaling on an unstable slope before starting other rockfall mitigation work on that unstable slope.

623.02B Slope Scaling Equipment. (Added Subsection).

Perform slope scaling using rope/cable-supported laborers with scaling bars, portable hydraulic wedges, and air pillows. Use of hand drills, splitters, or other mechanical/hand tools may be used

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by the Contractor if approved in writing by the CO. Do not use excavators, cranes, or other heavy equipment for slope scaling unless otherwise directed by the CO in writing.

623.02C Slope Scaling Submittals. (Added Subsection).

At least 14 days before starting slope scaling work, submit the following detailed information to the CO, in writing.

(b) Provide resumes for the drill foreman and each drill operator(s) with the following:

(1) Project owner information, including name, title, and current contact information for each project work experience referenced.

(2) Five projects over the past 5 years that the drill foreman has completed safely and satisfactorily with at least 3000 linear feet of rock bolts and dowels installed according to these contract requirements.

(3) Three projects over the past 5 years that each drill operator has completed safely and satisfactorily with at least 1000 linear feet of rock bolts and dowels installed according to these contract requirements.

(a) **Personnel.** Provide resumes for the Scaling Foreman, Scalers, and Apprentices that are qualified to perform the work. For each resume, provide project owner information, including name, title, and current contact information for each project work experience referenced, and provide a copy of the required certification(s) for Apprentices showing each have satisfactorily performed similar work for the following minimum durations, or have the required certification(s). Do not use workers that have not been approved by the CO.

(1) **Scaling Foreman.** Provide a scaling foreman with at least 1,500 hours, and at least 3 years of documented experience as a slope scaling foreman on similar projects.

(2) **Scaler(s).** Provide scalers with at least 1,000 hours, and at least 1 year of documented experience on similar projects.

(3) **Apprentice(s).** Apprentices certified by the Society of Professional Rope Access Technicians (SPRAT) or a demonstrated equivalent training or certification as follows, may perform work on slopes less than 50 vertical feet in total height, at a ratio of two assigned designated scalers to one apprentice.

(a) SPRAT or PCIA Certified Level I Technician, or demonstrated equivalent training, with at least 500 hours of dual rope access within the last year (see www.sprat.org and <https://pcia.us/>); or

(b) SPRAT or PCIA Certified Level II Technician with Veterans Preference. Submit DD Form 214 or equivalent DD Form documenting an *Honorable Discharge*. Veterans with preference will be given priority.

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(b) Slope Scaling Work Plan. Submit a plan detailing the following information. Do not start slope scaling work until the CO approves the work plan in writing.

- (1) The proposed construction sequence and schedule.
- (2) The types of equipment and tools to be utilized in the work.
- (3) The number of Scaling Foremen, Scalers, and Apprentices working on the project.
- (4) Removal and disposal plan for existing ditch debris and debris generated from slope scaling and vegetation removal.

623.02D Slope Scaling Operations. (Added Subsection).

(a) Provide work site safety and perform work to protect workers, equipment, and the travelling public from hazardous, and potentially hazardous conditions. Do not perform work when the Scaling Foreman is not present to direct the work. Maintain constant two-way radio contact between the Scaling Foremen, on-slope scalers and apprentices, equipment operators, and flaggers.

Provide safety scaling beyond scaling and tree removal limits boundaries as needed to safely perform the prescribed work. This work is subsidiary to the prescribed work and the hours needed to perform this work will not be tracked or paid for separately.

(b) Perform work such that a Scaling Foreman has constant visual contact with all scalers and apprentices working on unstable slopes. Provide additional Scaling Foremen to ensure this requirement is continuously met. The Scaling Foreman is not allowed to slope scale with the on-slope scalers/apprentices.

(c) Only use apprentices on slopes less than 50 vertical feet in total height. Do not allow apprentices on these slopes when the two designated scalers cannot accompany the apprentice; and when the Scaling Foreman cannot directly supervise the apprentice. If an apprentice scaler is performing in a dangerous or unsafe manner at any time, they will be removed from the project by the CO.

(d) Remove trees and other vegetation as shown in the plans, as specified herein, and as directed by the CO. Cut trees and large woody shrubs according to Subsection 201.04, leaving root wads intact. Paint fresh, flush cut stumps to blend into the natural landscape. Remove vegetation before the rock scaling operations begin.

(e) Unless otherwise directed by the CO, establish anchors for ropes/cables within the work limits.

(f) Scale unstable slopes from the top, working down toward the road, removing loose, detached, and identified blocks/areas of rock as the work progresses.

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(g) Perform general scaling and intensive scaling according to the plans, the CO-approved Slope Scaling Work Plan, these Section 623 requirements, and as directed by the CO.

(h) Remove scaled rock blocks that hang up on slopes during scaling operations. Remove additional rock blocks as directed by the CO, and continue scaling an unstable slope until directed by the CO to stop work on the unstable slope.

(i) Break non-transportable rocks into manageable pieces for hauling and in accordance with Subsection 107.10.

(j) Adjust operations and allow emergency traffic through the work site according to Subsection 156.04.

(k) Re-establish the original ground surveyed according to Subsection 623.02A by removing debris generated from slope scaling and vegetation removal. Dispose of the removed debris according to Subsection 203.05(a).

Measurement

623.04 Add the following:

Do not measure construction survey and staking; clearing and grubbing; and removal of scaled debris to the designated disposal area(s) related to Section 623 work.

Do not measure hours for the Scaling Foremen.

Do not measure hours for safety scaling work.

Do not measure special labor hours when the Scaling Foreman is not overseeing the scalers or apprentices.

Measure special labor hours by actual hours of production time of each scaler/apprentice for all unstable slopes.

Hour measurements for each special labor – scaler starts when each scaler/apprentice is equipped and begins active, on-slope scaling of the rockfall mitigation slope; and ends when each scaler/apprentice has descended the rockfall mitigation slope.

Payment

623.05 Add the following:

Payment for special labor hours are based on the total hours shown in the bid schedule, and is not subject to adjustments under Subsection 109.06 when special labor hours deviate from the estimated hours shown at each individual unstable slope.

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Hours for each special labor – scaler will be rounded up to the nearest quarter hour at the end of each shift.

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Section 625. — TURF ESTABLISHMENT

01/01/14–FP14

Construction Requirements

625.08 Mulching. Delete the second and third paragraphs of paragraph (b) and substitute the following:

(a) Dry method. Place the conserved chip debris mulch on top of the conserved topsoil on slopes with a gradient less than 1V:1H. Spread the chip debris mulch material to a depth that, after settlement provides the required depth.

(b) Hydraulic method. Apply the bonded fiber matrix to slopes with a gradient of 1V:1H after the conserved topsoil and landscape logs have been placed. Apply bonded fiber matrix hydraulic mulch at a minimum rate of 3000 pounds per acre. Apply so no hole in the matrix is greater than 0.04 inches. Apply so that no gaps exist between the matrix and the soil.

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Section 635. — TEMPORARY TRAFFIC CONTROL

04/20/18–FP14

635.07 Construction Signs. Delete the text of this Subsection and substitute the following:

Fabricate and install sign panels according to Subsection 633.05. Use Type III, IV, VIII, IX, or XI prismatic retroreflective sheeting on sign panels. Roll-up signs may be used instead of panels when approved by the CO. For roll-up signs, use Type VI retroreflective sheeting.

Furnish posts conforming to Subsection 718.04, except wood posts may be untreated. Install posts according to Subsection 633.04. Portable sign supports may be used instead of sign posts when approved by the CO.

Remove or completely cover unnecessary signs. Use metal, plywood, or other acceptable material to cover signs. Do not use adhesive glue, tape, or mechanical fasteners that mar the face of the panel of the sign to be covered.

635.23 Acceptance. Delete the first paragraph and substitute the following:

Material for temporary traffic control devices will be evaluated under Subsections 106.02 and 106.03. Do not provide a copy of the certifications for temporary traffic control materials to the CO, unless otherwise directed by the CO.

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**Section 647. — ENVIRONMENTAL MITIGATION
(ADDED SECTION)**

08/01/14–FP14

Description

647.01 This work consists of placing landscape logs on finished slopes.

Construction Requirements**647.02 General.**

Notify the CO five days before beginning work to allow staking of landscape log locations. Allow the CO to select and inspect logs before installing logs on the slopes. Remove limbs as necessary to allow tree trunks to sit flush against finished slope. Remove additional limbs as directed by the CO.

Prior to installing Landscape Logs on slopes, conserve topsoil according Section 204. After Landscape Logs have been installed, prepare slopes for topsoil and place topsoil according to Section 624.

647.03 Placement. Place logs in a random fashion to match surrounding undisturbed area at CO identified locations along slopes and as shown in the plans. Embed logs into the slope so that at least half the log is embedded; measure embedment depth along the diameter of each log. Minimize damage to the existing slopes while placing logs by placing logs from a non-intrusive location whenever possible. Repair all damage to slopes that result from log placement work.

647.04 Anchoring. Secure landscape logs by pinning in place with hardwood stakes, native logs or boulders or the structural equivalent as approved by the CO. Install one stake per 10 linear foot of landscape log, minimum two stakes per log. All stakes must be embedded 6-8 inches into the slope. Embed all stakes 6 inches unless refusal is achieved. Remove all stakes embedded less than 6 inches and set a replacement stake in a new location.

647.05 Acceptance. Work under this Section will be evaluated under Subsection 106.02.

Measurement

647.06 Measure the Section 647 items listed in the bid schedule according to Subsection 109.02.

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Payment

647.07 The accepted quantities will be paid at the contract price per unit of measurement for the Section 647 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

Special Contract Requirements

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**SECTION 651. — DRAPED ROCKFALL PROTECTION
(ADDED SECTION)**

08/01/14–FP14

Description

651.01 This work consists of installing draped rockfall protection.

Material

651.02 Conform to the following Subsections:

Anchorage devices	722.01
Anchor tendons	722.02
Draped rockfall protection fabric	710.12
Hardware	717.01(f)
Minor concrete structures	601
Nonshrink grout	725.13(b)
Water	725.01
Wire rope or wire cable	709.03

Construction Requirements

651.03 Personnel. Use a contractor that has successfully constructed at least five (5) draped rockfall protection projects, within the last five (5) years, that includes installing draped rockfall protection systems on steep slopes. Assign an on-site supervisor that has successfully installed at least five (5) draped rockfall protection systems on steep slopes within the last five (5) years. Employ drill operator(s) that have successfully installed 1,000 linear feet of ground anchors on steep slopes within the last three (3) years.

651.04 Submittals. At least 14 days before starting draped rockfall protection work, submit the following documentation for approval according to Subsection 104.03. Allow 14 days for review.

(a) Materials. Do not order a material until the applicable material submittals are approved.

(1) Identify the steel fabric material supplier(s), and submit the following documentation.

(a) Evidence showing the manufacturer has at least five (5) years of experience manufacturing the specified product(s) used in similar system applications and capacities. Include details of the manufacturer's testing procedures and certification of a quality assurance program.

(b) Evidence showing satisfactory performance of the supplier's steel fabric material, installed as draped rockfall protection, on past projects with similar site conditions.

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(2) An inclusive list with catalogue cuts for each proposed system component including: grout; wire rope(s); wire rope anchors, thimbles, ferrules; and other fastening hardware.

(3) Mill certificates for wire rope(s).

(4) Shop drawings for temporary yokes or load frames used for anchor proof testing including: load cells; test jack and master gauges; and all calibration data performed by an independent testing laboratory within 60 days of the submittal for each device used. Recalibrate each device that experiences damage or has been involved in an uncontrolled fall.

(b) Equipment. Do not use self-propelled drill rigs to install ground anchors. Equipment rejected by the CO is not allowed for draped rockfall protection work.

(1) List all equipment to be used for rockfall protection work, including equipment capacities and intended uses, and rental rates.

(c) Personnel Qualifications. Submit documentation showing the contractor, on-site supervisor, and drill operators are all qualified, and possess the required experience and expertise to perform the contracted work. Include project names and summaries; owner names and contact information; and resumes for the on-site supervisors and drill operator(s).

Do not perform rockfall protection work with workers that are not approved by the CO.

(d) Work Plan. Include the following in the work plan that provides work site safety and minimizes impacts to existing facilities and the environment. Before starting work in the location of the draped rockfall protection (wire mesh), scale the slope area identified in the plans according to Section 623, install rock bolts and dowels according to Section 260.

Do not start rockfall protection work until the work plan is approved by the CO.

(1) Explain how personnel and equipment will perform work so that the public, construction personnel, and equipment exposures to hazardous and potentially hazardous conditions are minimized. Include temporary rockfall mitigation measures, special designs, and installation procedures deemed necessary to safely perform the rockfall protection work described herein.

(2) Explain how personnel and equipment will install steel fabric materials on the designed slope locations, including any temporary anchoring needed.

(3) Provide a list of materials, equipment, and the methods for drilling, installing, grouting, and testing ground anchors; including the mix design for grouting operations.

(4) Provide procedures for attaching steel fabric materials to upper support ropes, adjacent steel fabric panels, and any other temporary and permanent supports. Include methods and equipment for delivering and placing on the designed slope locations.

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651.05 General. Verify the draped rockfall protection work limits and perform the required scaling, rock bolting and doweling, and other on-slope rock stabilization work prior to connecting the steel fabric to the ground anchor and support ropes. Treat all exposed steel fabric and appurtenances with stain according to Section 563.

Store, handle, and install draped rockfall protection without damaging the galvanized rockfall protection system. Repair or replace damaged portions of the rockfall protection system as directed by the CO.

Construct the draped rockfall protection system using high tensile strength wire mesh. Install the draped rockfall protection from the top working downward, contouring the steel fabric material with the existing ground topography to the bottom limits of the required installation. Trim steel fabric material as needed at each work limit, and treat field cuts according to Section 563.08(c).

651.06 Upper Support Ground Anchors. Locate and install temporary markers at proposed anchor locations that satisfy the contract requirements. Permanently mark proposed anchor locations approved by the CO. Do not install anchors at locations that have not been approved by the CO. Drill, bore, auger, and/or excavate as specified below to install ground anchors: centered in holes a minimum of 2-inches off the bottom for the excavation to fully encapsulate; plumb or normal to the existing slope; and as applicable to the following field conditions.

(a) Type I Soil Installation. Excavate a minimum 5.67-foot deep, 12-inch diameter hole to receive the anchor. Install galvanized wire rope with the anchor end possessing a factory installed ferrule that has a minimum tensile strength of at least 100% to that of the wire rope used. Completely fill anchor holes with high early strength cement concrete, to encapsulate anchors within holes. Perform concrete work according to Section 601.

(b) Type II Soil and Shallow Soil Over Rock Installation. Use sacrificial drill bits to install hollow-core self-drilling anchors with a minimum diameter of 1 ¼-inch to a minimum depth of 5.5-feet in soil or if shallow rock is encountered, extend the anchor depth to a minimum of 5.5 feet into rock. Attach anchor to ¾-inch diameter galvanized wire ropes with factory installed couplers that possess at least 100% of the breaking strength of the wire specified for the tag lines. Completely fill drilled holes with nonshrink grout, to encapsulate anchors within drilled holes.

(c) Rock Installation. Excavate a minimum 5.67-foot deep, 2-inch diameter hole to receive the anchor. Install the ferrule-end wire rope specified under Subsection 651.06(a). Use nonshrink grout to fill anchor holes according to Subsection 651.06(b).

After filling anchor holes with nonshrink grout or concrete, allow cementitious material to cure, and do not disturb, or apply loads to anchors for at least three days.

651.07 Testing Ground Anchors. Sample each grout batch used to construct anchors, and submit required samples to an independent testing laboratory for three-day and seven-day compressive strength testing. Submit results and samples for verification testing when required.

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Perform axial pullout proof tests on five percent of the installed upper support ground anchors, with a minimum of three tests performed. Do not disturb or apply any load to any of the anchors until the grout or concrete has cured for a minimum of three days. Complete testing before connecting any system components to any anchors. Perform the test by applying a 20 kip test load to the anchor for 10 minutes, using a temporary yoke or load frame that does not apply bearing pressures on the ground within three feet of the anchor. Proof tests for an anchor will be accepted if an anchor maintains the test load for 10 minutes with no loss of load.

Anchors that do not pass axial pullout proof testing are to be replaced as directed by the. Test all anchors if an axial pullout proof test fails.

651.08 Wire Ropes and Steel Fabrics. Tag lines, support and seaming ropes, and steel fabrics may be installed individually, or in combination. Do not attach tag lines to upper support ground anchors until successfully completing the required proof testing under Subsection 651.07.

Set wire rope lengths in the field, terminating each wire rope run with a loop end. Attach support ropes to tag lines with the required shackles, and attach steel fabric panels to support ropes by lacing 5/16-inch diameter wire rope through each steel fabric cell and around adjacent support/seaming ropes.

Overlap adjacent steel fabric panels at least three inches, and connect adjacent panels according to the manufacturer's recommendations at all horizontal and vertical seams. Increase overlaps as needed to cover the work limits and minimize field cuts. Do not diagonally cut the high tensile strength mesh. Lace additional wire ropes through steel fabric cells to join overlapping steel fabrics overlaps greater than three inches. Do not use hog ring fasteners to join overlapping steel fabrics.

Overlap adjacent twisted wire mesh and high tensile strength steel wire mesh panels at least three inches, and connect adjacent panels according to the manufacturer's recommendations.

Set the bottoms of steel fabric panels as directed by the CO.

651.09 Acceptance. See Table 651-1 for sampling, testing, and acceptance requirements.

Material for draped rockfall protection, wire mesh (high tensile strength) will be evaluated under Subsections 106.02, 106.03, and 106.04.

Construction of, and erection of draped rockfall protection, wire mesh (high tensile strength) will be evaluated under Subsections 106.02, and 106.04.

Measurement

651.10 Measure the accepted Section 651 items listed in the bid schedule according to Subsection 109.02 and the following:

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When measuring Section 651 items by the square yard, measure the completed in place work performed on the ground surface, excluding overlaps and areas trimmed off.

Commented [ADA(3):
Pay item 65101-1000 Draped Rockfall Protection, Wire Mesh (High
Tensile Strength) by the SQYD

Do not measure scaling, tree removal, and site preparation work required for construction access and installation of draped rockfall protection that is not included within the extents of scaling shown on the Plans.

Payment

651.11 The accepted quantities will be paid at the contract price per unit of measurement for the Section 651 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

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Table 651-1
Sampling, Testing, and Acceptance Requirements

Material or Product (Subsection)	Type of Acceptance (Subsection)	Characteristic	Test Methods Specification	Sampling Frequency	Point of Sampling	Split Sample	Reporting Time
Source							
Aggregate Quality (703.01)	Measured and tested for conformance (105.04)	Quality	AASHTO M 6	1 per material type	Source of material	Yes	Before producing
Production							
Nonshrink Grout (725.13(b))	Measured and tested for conformance (106.04)	Flow	ASTM C 939	1 per mix design	Source of material	Yes, when requested	Within 24 hours after completion
		Compressive Strength (3-day and 7-day)	ASTM C 942	1 set per batch for ground	Source of material	Yes, when requested	Within 24 hours after completion
Proof test for draped rockfall protection anchors	Measured and tested for conformance (106.04)	Deformation	Subsection 651.07	5% of installed anchors (3 minimum)	Installation	No	Within 24 hours after completion of test

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SECTION 653. — MIDSLOPE ROCKFALL ATTENUATOR (ADDED SECTION)

Description

653.01 This work consists of installing midslope rockfall attenuators.

Material

653.02 Conform to the following Section and Subsections.

Attenuator net panels	710.13(b)
Bearing plates	717.01(b)
Fence post columns	710.13(a)
Hardware	717.01(f)
Hollow-core self-drilling ground anchors	722.02(g)
Minor concrete structures	601
Nonshrink Grout	725.13(b)
Nuts and washers	717.01(g)
Reinforcing bars	709.01(b)
Steel post foundation	710.13(c)
Structural carbon steel (steel plates)	717.01(a)(3)
Threaded bar ground anchors	722.02(i)
Water	725.01
Wire mesh backing	710.13(d)
Wire mesh backing fastener	710.13(a)(3)
Wire mesh backing lacing wire	710.13(a)(4)
Wire rope anchors	722.02(h)
Wire rope or Wire Cable	709.03

Construction Requirements

653.03 Qualifications. Use a contractor that has successfully constructed at least five (5) midslope rockfall attenuator projects, within the last five (5) years, that includes installing midslope rockfall attenuators on steep slopes. Assign an on-site supervisor that has successfully installed at least five (5) midslope rockfall attenuators systems on steep slopes within the last

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five (5) years. Employ drill operator(s) that have successfully installed 1,000 linear feet of ground anchors on steep slopes within the last three (3) years.

653.04 Submittals. At least 14 days before starting midslope rockfall attenuator work, the following documentation for approval according to Subsection 104.03. Allow 14 days for review.

(a) Materials. Do not order a material until the applicable material submittals are approved.

(1) Identify the cable net panel and wire mesh backing suppliers(s), and submit the following documentation.

(a) Evidence showing the manufacturer has at least five (5) years of experience manufacturing the specified product(s) used in similar system applications and capacities. Include details of the manufacturer's testing procedures and certification of a quality assurance program.

(b) Evidence showing satisfactory performance of the supplier's cable nets and steel fabric material, installed as midslope rockfall attenuator, on past projects with similar site conditions.

(2) An inclusive list with catalog cuts for all system appurtenances to be used including the anchors, support system, lacing wire rope, wire mesh fasteners, anchor bars, wire rope anchors, grout, wire rope, clips, thimbles, ferrules, steel rings and other fastening hardware.

(3) Mill certificates for wire rope(s).

(4) Shop drawings for temporary yokes or load frames used for anchor proof testing including: load cells; test jack and master gauges; and all calibration data performed by an independent testing laboratory within 60 days of the submittal for each device used. Recalibrate each device that experiences damage or has been involved in an uncontrolled fall.

(b) Equipment. Do not use self-propelled drill rigs to install ground anchors. Equipment rejected by the CO is not allowed for midslope rockfall attenuator work.

(1) List all equipment to be used for rockfall protection work, including equipment capacities and intended uses, and rental rates.

(c) Personnel Qualifications. Submit documentation showing the contractor, on-site supervisor, and drill operators are all qualified, and possess the required experience and expertise to perform the contracted work. Include project names and summaries; owner names and contact information; and resumes for the on-site supervisors and drill operator(s).

Do not perform rockfall protection work with workers that are not approved by the CO.

(d) Work Plan.

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(1) Before starting work in the location of the midslope rockfall attenuator, scale the slope area identified in the plans according to Section 623, install rock bolts and dowels according to Section 260, and install horizontal drains according to Section 610.

(2) Explain how personnel and equipment will perform work so that the public, construction personnel, and equipment exposures to hazardous and potentially hazardous conditions are minimized. Include temporary rockfall mitigation measures, special designs, and installation procedures deemed necessary to safely perform the rockfall protection work described herein.

(3) The Contractor's plan for attaching cable net panels with wire mesh backing to the upper support rope and within the body of the mesh/net fabric installation.

(4) Provide a list of materials, equipment, and the methods for drilling, installing, grouting, and testing ground anchors; including the mix design for grouting operations.

(5) Provide procedures for attaching cable net panels with wire mesh backing to upper support ropes, adjacent steel fabric panels, and any other temporary and permanent supports. Include methods and equipment for delivering and placing on the designed slope locations.

653.05 General. Verify the midslope rockfall attenuator work limits and perform the required scaling, rock bolting and doweling, and other on-slope rock stabilization work prior to connecting the cable net panels with wire mesh backing to the ground anchor and support ropes. Treat all exposed steel posts, steel fabric(s), and appurtenances with stain according to Section 563.

Store, handle, and install midslope rockfall attenuator systems without damaging the galvanized rockfall protection system. Repair or replace damaged portions of the rockfall protection system as directed by the CO.

Construct the midslope rockfall protection at the locations shown in the plan or as directed by the CO. Construct all plates, holes, welds, swivels, and foundations for support posts as shown on the Plans or as directed by the CO. Locate the support posts, support ropes, tieback anchors as shown in the Plans. Install the midslope rockfall attenuator system within the required tolerances for alignment and orientation. Maximum top support wire rope length for the midslope rockfall attenuator is 160-feet. If the required installation length is longer than 160-feet, use a connection post and begin a new top support wire rope.

Install and attach the cable net panels and the wire mesh backing as shown on the plans. Use 9/16-inch wire seaming rope for connecting the net panels to the horizontal top B rope, truncating the seaming rope at each post and restarting it for the next span between posts. Connect corner cable K to the end post swivel and at least two cells into the cable net fabric at a connection, as shown on the Plans. Use a 9/16-inch wire seaming rope for corner cable K. Repair all damaged galvanizing after erection according to Subsection 563.08(c).

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Set the bottoms of attenuator net fabric panels as directed by the CO.

(a) Foundations. Excavate and prepare new foundations in accordance with Section 209. Use the post foundation shown in the Plans. The maximum distance between posts is 40-feet. Provide a proposed layout in plan between any new post alignments that shows the angles in the vertical and horizontal alignment between posts and layout a profile showing the ground surface elevation and top attenuator support rope elevation to the CO for approval.

If threaded ground anchor bars cannot be inserted into the drill holes due to caving conditions, use a hollow-core self-drilling ground anchor with a sacrificial drill bit to advance the anchor into the ground as shown on the Plans. Orient the hollow-core anchor bars as shown on the Plans. Determine the required anchor length necessary to provide a minimum axial pullout capacity of 30-kips for each self-drilling anchor. Fully encapsulate each ground anchor in either non-shrink grout or minor structure concrete, as shown in the Plans.

(b) Wire Rope Tightening. At every midslope rockfall attenuator post, tighten all C ropes and F ropes until they are taut. A taut rope is defined as one that has the following values in Table 653-1 as measured by a tension meter. Use a CHECKLINE® CTM2 – Quick Check Cable Tension Meter or equivalent that has been calibrated by an independent testing laboratory. Calibration must have taken place within 60-days before use on the project. A NIST traceable certificate of calibration, clearly indicating instrument and/or component serial/identification numbers, must be submitted for each wire type and size that the instrument is to be used to test. Each component (or a set such as sheaves used as a unit) is required to have an identification number. Additional calibration will be required at no more than a 180-day interval, or as directed by the CO at any lesser time, due to site specific conditions, wear, or abuse of any component. Manufacturer's calibration with same certification requirements will be accepted in place of independent certification for new instruments. The CO may waive the 60-day requirement for manufacturer's pre-calibrated new instruments.

Table 653-1. Wire Rope Tension Meter Values

Rope F or C Vertical Angle (degrees)	Minimum Allowable Rope Tension (lbf)
30	≥370
45	≥550
50 to 60	≥770

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653.06 Testing Ground Anchors. Sample each grout batch used to construct anchors, and submit required samples to an independent testing laboratory for three-day and seven-day compressive strength testing. Submit results and samples for verification testing when required.

Verify the wire rope anchor capacities by conducting axial pullout tests on all 103-kip capacity anchors, 25 percent of the 58-kip capacity anchors as selected by the CO. Provide a pullout test load that is 75 percent of the ultimate wire rope anchor capacity shown on the Plans. For pullout proof testing, an anchor is acceptable if it sustains the specified capacity for 10 minutes with no loss of load. Test against a temporary yoke or load frame with no part of the yoke or load frame within 3-feet of the anchor. If an anchor fails during testing, test all anchors. Replace all failed anchors. Complete anchor testing before connecting any system components to the anchors.

Verify that the 1¼-inch diameter hollow-core self-drilling ground anchors provide a minimum 30-kip axial pullout capacity for each anchor. Conduct the axial pullout test on a minimum of one ground anchor, as selected by the CO, from each foundation where hollow-core self-drilling ground anchors are used. Provide a pullout proof test load that is 75 percent of the minimum pullout strength requirement. An anchor is acceptable if it sustains the specified capacity for 10 minutes with no loss of load. Test against a temporary yoke or load frame with no part of the yoke or load frame within 3-feet of the anchor or the other four anchors associated with that post foundation if already installed. If a hollow-core self-drilling ground anchor fails, test all anchors associated with that post foundation.

Modify and replace all failed ground anchors and then retest. Complete anchor testing before constructing the remaining portion of the foundation. Replace all failed ground anchors.

653.07 Acceptance. Material for midslope rockfall attenuator will be evaluated under Subsections 106.02 and 106.03. Provide a production or commercial certification under Subsection 106.03.

Construction and erection of midslope rockfall attenuator will be evaluated under Subsections 106.02 and 106.04.

Measurement

653.08 Measure the Section 653 items listed in the bid schedule according to Subsection 109.02 and the following:

Measure the Midslope Rockfall Attenuator by the square yard of cable net/mesh panels erected on the slope. Area calculations of the cable net/mesh panels may be made prior to and during erection based on 1) the number or rolls or partial rolls of cable net panels with wire mesh backing used in final construction as approved by the CO, or 2) the square yard of covered area according to the neat line of the installed cable net panel with wire mesh backing portion of the system on the slope.

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Do not measure scaling, tree removal, and site preparation work required for construction access and installation of midslope rockfall attenuator that is not included within the extents of scaling shown on the Plans.

Payment

653.09 The accepted quantities will be paid at the contract price per unit of measurement for the Section 653 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section including installation of all steel posts, anchors, and all anchor testing. See Subsection 109.05.

Section 654. — DRAIN MESH (ADDED SECTION)

Description

654.01 This work consists of furnishing and installing anchored mesh for drainage of a shear zone in the tunnel interior, as indicated on the Drawings and directed by the CO.

Anchor mesh to rock dowels (interior) as specified in subsection 260.

Material

654.02. Conform materials to the following:

Provide high tensile strength steel wire mesh. Geobugg TECCO® G65/3 mesh (TECCO® mesh) manufactured by Geobugg North America, LLC is an acceptable product. Protect and galvanize drain mesh with 150 g/m2 zinc/aluminum coating.

Provide connection clips fabricated from 4 mm high tensile strength steel wire for drain mesh connectors. Geobugg TECCO® T3 connection clips are an acceptable product. Protect from corrosion and galvanize the wire with 150 g/m2 zinc/aluminum coating.

Provide boundary ropes as galvanized and the heavy type steel wire rope as described in the Geobugg Tecco® Slope Stabilization System Product Manual (12 mm [approximately 0.5 inch] diameter) with a minimum breaking strength of 23,940 pounds.

Provide Type 2 compression claws to fasten the drain mesh to the boundary ropes as minimum 8 mm diameter carbon steel bar and hot dipped galvanized in accordance with ASTM A153/ A153M, Class B-3 with 300 g/m2 coating.

Provide wire rope thimbles as heavy-duty, hot-dip galvanized, with eye dimensions sized to fit over epoxy coated #8 threadbar and a saddle dimension appropriate for the diameter of the

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boundary rope. Conform wire rope thimbles to meet the requirements of Fed Spec FF-T-276B, Type III.

Provide wire rope clips in accordance with Fed Spec FF-C-450, Type 1, Class 1 and hot-dip zinc galvanized according to ASTM A153/ A153M.

Provide spike plates (P33 system plate) made from minimum 7 mm thick steel and hot dip galvanized in accordance with ASTM A123/ A123M with a minimum layer thickness of 3.3 mils and diamond shaped with minimum dimensions of 8.1 inches (205 mm) by 13.0 inches (330 mm).

Construction Requirements

654.03 Qualifications. Provide a foreman that has completed at least one other project within the past 5 years where similar slope mesh was installed as slope/ground support.

654.03 Submittals. In accordance with Subsection 104.03, submit the following at least 21 days before starting mesh drain installations. Do not start this work until the CO approves these documents in writing.

- (a) Qualifications, experience record, and at least two references for installer and foreman in charge of drain mesh installations.
- (b) Procedures for installing drain mesh and boundary ropes and methods for fastening the mesh and ropes to the rock dowels (interior).
- (c) Procedures for placing drain mesh panels at designated locations on the tunnel crown, quarter-arch, and sidewall.
- (d) An inclusive list with catalog cuts for all system components and appurtenances, including drain mesh, wire ropes, wire rope clips, thimbles, spike plates, nuts, mesh connectors, and boundary rope connectors.
- (e) Certificates of compliance from the manufacturer verifying that system components and appurtenances meet the specified requirements.
- (f) Shop drawings illustrating how the system components are to be assembled and installed.
- (g) Calibration data, including a graph of torque versus tension for each torque wrench to be used. Torque wrenches shall have been calibrated within the 30 calendar days prior to the start of work at the site.

654.04 Delivery, Storage, and Handling. Suitably wrap, package or cover materials at the factory or shop to prevent being affected by dirt, water, oil, grease, and rust. Protect materials against abrasion or damage during shipment and handling. Place materials stored at the site on a well-

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supported platform and covered with plastic or other approved material. Protect materials from adjacent construction operations.

654.05 Installation. Install drain mesh in accordance with the drawings and specifications herein, and the recommendations of the manufacturer. When such recommendations differ from the requirements of this section, request clarification from the CO before proceeding.

(a) Install rock dowels (interior) for support of drain mesh in accordance with the provisions of Section 260 before installing weep holes, shotcrete, drain mesh, and boundary ropes, except install spike plates instead of bearing plates over (outside) the mesh.

(b) Use care in handling and installing slope mesh, boundary ropes, and appurtenances. Replace materials damaged by the Contractor's operations at the Contractor's sole expense.

(c) Install drain mesh in accordance with the manufacturer's recommendations and this Section, or as directed by the CO.

(d) Cut or trim slope mesh panels in accordance with the manufacturer's recommended procedure.

(e) Overlap adjacent panels of slope mesh in accordance with the drawings and the manufacturer's recommendations.

(f) Connect adjacent mesh panels using mesh connectors. Use one clip for each diamond-shaped mesh opening, horizontally and vertically.

(g) Install boundary ropes in accordance with the manufacturer's recommendations as described in the TECCO® Slope Stabilization System Product Manual, the drawings, this section, and/or as directed by the CO.

(h) Place top edge boundary ropes above the uppermost row of rock dowels (interior) and held in place by spike plates.

(i) Place bottom edge boundary ropes above the lowest row of rock dowels (interior) and held in place by spike plates.

(j) Place side edge boundary ropes outside the perimeter of rock dowels (interior) and held in place by spike plates.

(k) Fasten all boundary ropes to the slope mesh using boundary rope connectors. Fasten boundary rope connectors to every other diamond-shaped mesh opening.

(l) Terminate boundary rope segments with eye splices, consisting of a wire rope thimble and wire rope clips. Place eye splices as shown on the Drawings. A minimum of four wire rope clips are required for wire ropes smaller than 22 mm (approximately 7/8-inch).

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- a. Install the first wire rope clip farthest from the eye.
- b. Install the thimble, then install the wire rope clip closest to the thimble, and then install the middle wire rope clips.
- c. For all wire rope clips, place the U-bolt around the dead end of the cable and the saddle around the live portion of the cable.
- d. Space of the wire rope clips as shown on the Drawings, or as recommended by Geobruigg.
- e. Tighten both nuts on the U-bolt evenly, to a minimum torque of 27 foot-pounds, or as recommended by Geobruigg for the diameter of the wire rope. The required torque applies to properly lubricated threads.
- f. Re-check the torque on all wire clip U-bolts after releasing the cable tensioning device.

(m) Fasten eye splices to rock dowels (interior) and held in place with a flat washer and hex nut.

(n) Make one terminal eye splice where the boundary rope is slack, and complete the second eye splice once the boundary rope has been tensioned. Tension boundary rope tension as recommended by the slope mesh manufacturer. Assume that a 4-ton manual cable tensioning device ("come along") will be adequate for tensioning the boundary ropes.

654.06 Acceptance. Drain mesh will be evaluated under Subsections 106.02.

Measurement

654.07 Measure the Section 999 pay items listed in the bid schedule according to Subsection 109.02 and the following as applicable. Measure the accepted drain mesh by the in-place square yard.

Payment

999.08 The accepted quantities will be paid at the contract price per unit of measurement for the Section 999 pay items listed in the bid schedule. Payment will be full compensation for the work prescribed in this Section. See Subsection 109.05.

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DIVISION 700 MATERIAL

Section 701. — CEMENT

Add the following:

701.03 Shotcrete Cement.

(a) **Cement.** Conform to ASTM C150 and ASTM C1116, Type II or Type I/II low alkali.

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Section 703. — AGGREGATE

703.16 Shotcrete Aggregate. Add the following:

- (c) **Normal weight aggregate.** Conform to ASTM C33 and limit quantities of deleterious substances according to ASTM C33 Tables 1 and 3.

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Section 709. — REINFORCING STEEL AND WIRE ROPE**709.03 Wire Rope or Wire Cable.** (Added Subsection).

Furnish 6x19 independent wire rope core (IWRC) or equivalent, Extra Improved Plowed Steel (EIP) stranded steel wire ropes meeting ASTM A1023 and the following.

- (a) **1-inch wire rope.** Provide 1-inch diameter wire rope with a minimum breaking strength of at least 103,000 pounds.
- (b) **¾-inch wire rope.** Provide a ¾-inch diameter wire rope with a minimum breaking strength of at least 58,500 pounds.
- (c) **9/16-inch wire rope.** Provide a 9/16-inch diameter wire rope with a minimum breaking strength of at least 33,500 pounds.
- (d) **5/16-inch wire rope.** Provide a 5/16-inch diameter wire rope with a minimum breaking strength of at least 10,500 pounds.

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Section 710. — FENCE AND GUARDRAIL**710.12 Draped Rockfall Protection Fabric.** *(Added Subsection).*

Furnish a steel wire mesh, that is not a cable rope product. Geobrug Tecco® G65 wire mesh manufactured by Geobrug North America, LLC is an acceptable product. Identification by brand name is intended to be descriptive, not restrictive, and is intended to indicate the quality and characteristics of the product that will be satisfactory. Submit “or equal” products meeting the following salient characteristics to the CO for approval:

Furnish hardware with:

- (a) A homogenous mesh consisting of one type of wire.
- (b) A minimum tensile strength of the steel of 250,000 psi.
- (c) A minimum individual wire diameter of 0.118 inches.
- (d) A minimum tensile strength of the wire mesh of 10,000.lbs/ft.
- (e) A minimum bearing resistance against puncturing of the wire mesh of 40,000 lbs/ft².
- (f) A minimum tensile strength of the wire of 2,800 lbs meeting ASTM 1007, Carbon Steel Wire for Wire Rope.
- (g) A circle with a diameter of 2.5 inches must be able to fit within the mesh opening.
- (h) A maximum dimension within the mesh opening of 6 inches.
- (i) Zinc/aluminum galvanizing applied to the wire at a minimum weight of 0.40 oz/ft².
- (j) A CO-approved oxidized finish produced with the weathering agent specified under Subsection 725.19 (see Subsection 563.04). Use the weathering agent manufacturer, or their authorized application contractor to apply and fully cure the weathering agent for samples and products delivered to the job site.

Acceptable products include:

Geobrug Tecco® G65 wire mesh
Manufactured by Geobrug North America, LLC
22 Centro Algodones
Algodones, New Mexico 87001
505-771-4080
www.geobrug.com

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710.13 Midslope Rockfall Attenuator Materials. (Added Subsection).

(a) Fence post columns. Provide columns fabricated from wide flange structural members conforming to ASTM A992 and galvanized following fabrication in accordance with AASHTO M 111 (ASTM A123). Any bars or plates welded to steel posts must conform to ASTM A572 Grade 50 and be galvanized after fabrication in accordance with AASHTO M 111 (ASTM A123).

(b) Attenuator net panels. Supply net panels that are constructed from either a 1x3 high tensile steel wire spiral rope, 7x7, or 7x19 galvanized aircraft cable (GAC), EIP steel with a minimum nominal diameter of 5/16-inch and breaking strength of at least 10,500 pounds. Use net panels with a grid size opening no larger than 12 inches by 12 inches or that have a diamond in-circle diameter larger than 10 inches. For the net panels made with GAC wire rope, use wire rope that is fabricated and galvanized in accordance with Federal Specification RR-W-410E and ASTM A1023.

(c) Steel post foundation. Provide threaded bar anchors, reinforcing bar, self-drilling hollow-core bar anchors, and hardware for anchoring steel post assemblies to the ground surface as shown on the Plans.

If threaded bar ground anchors cannot be inserted following drilling due to caving, supply hollow-core, self-drilling ground anchors to support the concrete foundations that are 1¼-inch in diameter, continuously threaded, high strength, heavy wall, steel tubing conforming to ASTM A519. The anchors must include a sacrificial drill bit used to install the anchor that is a product of a manufacturer regularly engaged in the production of materials for the construction of ground anchors.

Use #3 (0.375-inch) diameter and #4 (0.50-inch) diameter, deformed, grade 60 bars conforming to AASHTO M 31, M 42, or M 53 as reinforcing steel bars for the concrete foundations (as shown in the Plans).

(d) Wire mesh backing. Supply one of the following mesh fabrics for use as the wire mesh attached to the attenuator net panels.

(1) 8 x 10 double twisted, hexagonal wire mesh meeting ASTM A975.

(2) Double-twisted wire mesh. Furnish a twisted wire mesh with a uniform hexagonal pattern formed by non-raveling double twist selvages. Form the mesh using soft tempered steel wire, possessing a minimum tensile strength of 60,000 psi when tested according to ASTM A370, and galvanized according to ASTM A641, Class 3 requirements. Provide a mesh with sized openings that do not exceed 3¼ inches by 4½ inches, and opening area of 10 square inches.

(3) High tensile strength steel wire mesh. Furnish high tensile strength steel wire mesh using wires with a minimum diameter of 0.079 inches, minimum tensile strength of 250,000 psi, and a Zinc/Aluminum coating applied at a minimum weight of 0.40 oz/ft².

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Provide a mesh with a longitudinal minimum tensile strength of 3.6 kips/ft, and a mesh diamond in-circle diameter no larger than 4 inches.

(4) Wire mesh fastener. Supply C-ring type fasteners composed of high tensile, galvanized wire with a wire diameter of 0.120 inches, an open diameter of 1½-inches and a closed inside dimension of 9/16-inches. Galvanize all fasteners conforming to ASTM A641 for zinc coatings, ASTM A764 for chemical and mechanical specifications; and to ASTM E8/MPT 2004 for tensile strength requirements.

(5) Wire mesh lacing wire. See Subsection 709.03(d).

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Section 711. — CONCRETE CURING MATERIAL AND ADMIXTURES

711.02 Air-Entraining Admixtures. Add the following:

Conform to the following for shotcrete:

- (a) **Air-entraining agent.** Conform to ASTM C260.
- (c) **Fly ash.** Conform to ASTM C618.

711.03 Chemical Addmixtures. Add the following:

Conform to the following for shotcrete:

- (a) **Water-reducer.** Super-plasticizer and conform to ASTM C494 and ASTM C1141.
- (b) **Silica fume.** Conform to ASTM M148, Type 1D or Type 2
- (c) **Accelerator.** Fluid type, applied at the nozzle with pump recommended by the manufacturer.
- (d) **Curing compounds.** Conform to AASHTO M148, Type 1D or Type 2,

Add the following subsection:

711.06 Fly ash. Conform to ASTM C618

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Section 716. — MATERIAL FOR TIMBER STRUCTURES

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716.01 Untreated Structural Timber and Lumber. Delete the third paragraph and substitute the following:

Cedar species will be used for construction, Select Structural Grade will be selected and submitted to the Contracting Officer for review before use.

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Section 717. — STRUCTURAL METAL**717.01 Structural Steel.** (Add the following):

(f) Hardware. Furnish wire rope clips that meet Federal Specification FF-C-450; wire rope thimbles that meet Federal Specification FF-T-276B; and, shackles and swivels that meet Federal Specification RR-C-271D. Provide wire rope clips, thimbles, shackles, and swivels sized for wire rope diameters of 1-inch, ¾-inch, 9/16-inch, and/or 5/16-inches. Galvanize all other hardware according to AASHTO M 232 (ASTM A153). Repair any damaged galvanizing according to Subsection 563.08(c).

(g) Nuts and washers. Supply washers conforming to ASTM F436 and nuts capable of developing the larger of either 100 percent of the minimum ultimate tensile strength (MUTS) of the bar. Anchor nuts will meet the specified strength requirement while permitting a maximum 5-degree misalignment between the nut and the bearing plate. A minimum of three tests, each from a different heat, are required. Supply washers conforming to AASHTO M 293, except plate washers will conform to ASTM A572, Grade 50. Galvanize nuts and washers after fabrication in accordance with AASHTO M 111 (ASTM A123) and for all other hardware galvanize in accordance with AASHTO M 232 (ASTM A153). Repair any damaged galvanizing according to Subsection 563.08(c).

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Section 719. — PAINT

08/01/14–FP14

719.10 Galvanizing Repair Paint. (Added Subsection).

Provide a high zinc dust content paint for galvanizing repair, and conform to the requirements of Federal Specification MIL-P-21035B.

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Section 722. — ANCHOR MATERIAL**722.01 Anchorage Devices.** Add the following:

- (c) Galvanize all anchorage device components according to AASHTO M 232 (ASTM A153).

722.02 Anchor Tendons. Add the following:

(g) **Hollow-core self-drilling anchors.** Furnish 1 ¼ inch hollow-core, threaded, deformed steel bar, self-drilling anchors of Grade 60 steel or better that meets or exceeds the minimum ultimate tensile strength requirements of the working design load. Include a sacrificial drill bit that is a minimum of 2-inch diameter from a manufacturer regularly engaged in manufacturing materials for the construction of hollow-core self-drilling anchors.

(h) **Wire rope anchors.** Furnish ASTM A1023 galvanized, stranded carbon steel wire ropes. Provide double legged wire rope anchors in the sizes and with minimum breaking strengths to provide the working loads specified. Provide 6x19 classification independent wire rope core (IWRC) made from Extra Improved Plowed (EIP) steel with a factory-installed swage-eye terminal on the distal end of the wire rope, possessing ferrules, thimbles, or wire clips as required by the manufacturer.

(i) **Threaded bar ground anchors.** Furnish 1-inch diameter (#8) deformed continuously threaded bars. Use a minimum Grade 60 steel for ground anchors.

722.03 Rock Bolts. Delete this Subsection and substitute the following:**722.03 Rock Bolts and Rock Dowels.**

(a) **Bars.** Furnish continuously threaded steel reinforcement bars that conform to either AASHTO M 31 Grade 75 deformed bars, ASTM A 615 Grade 75 deformed bars, ASTM A 706 Grade 80 deformed bars for rock bolts and dowels. The bending requirements of AASHTO M 31, ASTM 615, and ASTM 706 do not apply.

Provide rock dowels with a minimum No. 8 bar size.

Threaded steel reinforcement bars for rock bolts meeting the requirements of ASTM A 722 Grade 150 Type II, or AASHTO M 275 Grade 150 Type II capable of being post-tensioned to the design loads, performance test loads, and proof loads specified are also allowed.

(b) Hardware.

(1) **Bearing Plates.** Furnish bearing plates for the design loads provided that conform to PTI, *Recommendations for Prestressed Rock and Soil Anchors* for the respective application; with the minimum 8" x 8" square dimension shown on the plans. Determine thickness of bearing plates.

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(2) Nuts and Couplers. Furnish nuts and couplers that exceed 100 percent of the minimum ultimate tensile strength of the bar. Furnish nuts and couplers meeting AASHTO M 169 or ASTM A 108 for Grade 75, and 80 bars; and for Grade 150 bars, furnish nuts and couplers meeting ASTM A 29 or ASTM A 536.

(3) Washers. Furnish washers conforming to ASTM F 436. Furnish spherical and beveled washers conforming to ASTM A 536 and ASTM A 47.

(4) Centralizers. Fabricate centralizers from materials that are not deleterious to steel bars. Do not use wood.

(c) Corrosion Protection. Furnish anchor bars and hardware with hot dip galvanizing for corrosion protection as applicable. Use hot dip galvanizing conforming to ASTM A153 with a minimum thickness of 3.9 mils. Provide corrosion protection for steel anchor bars and hardware, from delivery of materials through complete installation, repairing damaged galvanizing according to Subsection 563.08(c).

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Section 725. — MISCELLANEOUS MATERIAL**725.17 Reinforcing Fibers.**

(a) Fibers for shotcrete. Delete the text of this subsection and substitute the following:

Conform with ASTM C1116 Type III and manufactured specifically for the reinforcement of concrete.

725.19 Weathering Agent. (Added Subsection).

Furnish a stain coloring agent that oxidizes galvanized steel surfaces to match the surrounding native environment. Natina® galvanized metal colorant manufactured by Natina Products, LLC is an acceptable product. Identification by brand name is intended to be descriptive, not restrictive, and is intended to indicate the quality and characteristics of products that will be satisfactory. Submit “or equal” products meeting the following salient characteristics to the CO for approval:

- (a)** Aqueous solution consisting of a variety of natural oxidizers.
- (b)** Variety of natural brown earth tones available through blending and additional applications.
- (c)** All coloring developed through oxidation process.
- (d)** Performance life exceeding 25 years for nonaggressive installation conditions.
- (e)** Non-harmful to both steel galvanization and shotcrete.
- (f)** Non-fading due to sun and atmospheric exposure.
- (g)** Non-injurious and no adverse reactions to soils, seeds, human, and animal life.
- (h)** Non-polluting, non-volatile, non-toxic, and leaves no undesirable residues in the soil.

Acceptable products include:

Natina® galvanized metal colorant
Manufactured by Natina Products, LLC
1577 First Street
Coachella, CA 92236
877-762-8462
www.natinaproducts.com

Furnish weathering agent ready-mixed at the manufacturer’s plant; in new, airtight containers that are clearly labeled with the exact name of the weathering agent, applicable Federal Specification Number, Manufacturer’s name and address, and lot/batch number. Furnish containers meeting the U.S. Department of Transportation Hazardous Material Shipping Regulations as applicable. Show

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weathering agent handling precautions on the container labels. Store containers according to the manufacturer's recommendations, and do not open containers until ready for use.

Weathering Agent involves applying a stable one/two-step component solution directly to galvanized surfaces. Develop full coloration within two weeks of application. Control or modify final color of the weathering agent by custom blending the basic ingredients, application techniques, dilution rate of the color concentrate with water, or a combination of these methods.

Once the weathering agent is applied, ensure no corrosive by-products are present and only nitrate fertilizer products are present as soluble residues.

725.20 Rock Bolt Bond Breakers. (Added Subsection).

Provide grease, and sleeved bond breakers for rock bolts fabricated from plastic tube or pipe having the following properties:

- (a) Resistant to chemical attack from aggressive environment, grout or corrosion inhibiting compound.
- (b) Resistant to aging by ultra-violet light.
- (c) Non-detrimental to rock bolt. Resistant to damage caused by abrasion, impact, crushing and bending during handling and installation.
- (d) Enables rock bolts to elongate during testing.
- (e) Resistant to distortion caused by heat generated by the curing of the grout.
- (f) Furnish a grease that conforms to PTI, *Recommendations for Prestressed Rock and Soil Anchors*, and use grease between sleeved bond breakers and steel rock bolts.

Table 725-1
Wall Thickness Requirements for Sleeved Bond Breakers

Type	Nominal	Minimum
HDPE/PP	0.060 in. (1.5 mm)	0.050 in. (1.25 mm)
PVC	0.040 in. (1.0 mm)	0.035 in. (0.9 mm)

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Fire Protection and Suppression Plan

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FIRE PRECAUTIONS

This plan outlines the channels of responsibility for fire prevention and suppression activities and sets up an attack procedure in the event of fire within the Project Area. The Project Area is defined as that area, which is in and adjacent to the project rights-of-way and work areas and all roads, used in connection with the work.

I. Responsibilities

A. Contractor-Fire Suppression

1. It is understood and agreed that the Contractor will do all in his/her power to prevent and suppress fires on or adjacent to the Project Area, as stipulated in the contract.
2. Responsible for and will direct all fire activities on the project until relieved by a Park Officer and will insure that prevention and suppression actions are in accordance with contract requirements, including this fire plan. Contractor shall delegate the next highest in authority on the job to be responsible for the above activities when he/she is not on the project.
3. In line with this agreement, individuals will be supplied from the Contractor's crews to fight fires within the project area, up to the total number of individuals employed by the Contractor, as they are needed for the response to a fire started by the contractor. Contractor resources will be immediately released as soon as possible from firefighting duties upon the arrival of paid/volunteer firefighting resources dispatched by the Park.
4. The Contractor insures that this Fire Plan will be complied to for the duration of the contract.

B. Olympic National Park, Chief Ranger

1. The Chief Ranger is responsible for all fire activities within the Olympic National Park on which the contract project is located. The Chief Ranger designates the Park's Fire Management Officer (FMO) as the Park representative for any discussions concerning the fire plan with the Contractor, including needed equipment and action to be taken when a fire occurs. The FMO will notify the Contractor through the Contracting Officer's Representative (COR) to take corrective actions when fire requirements are NOT in compliance.

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II. Prevention and Contractor Furnished Manpower, Tools, and Equipment Required on all Contracts During Fire Season

- A. Furnish to the CO a list of manpower and equipment used on the contract on forms furnished by the Park Service. Changes in Contractor's personnel shall be reflected in amendment to the list.

Fire Prevention:

Smoking: Smoking is prohibited except in cleared areas as agreed upon by the Contractor and CO, during the fire season which is designated as between May 10 until October 20. No smoking is permitted while walking or working within the woods. The contractor will utilize "butt cans" to collect cigarette or cigar butts in designated areas.

Refueling Chainsaw/Soil Auger: Refueling will be confined to a six-foot diameter area cleared to mineral earth. Chainsaws/soil auger spark arresters shall be U.S. Forest Service approved, and will be cleaned daily. A size "O" or larger round-pointed shovel with a minimum of a 38-1/2-inch handle and a fire extinguisher shall be within 10 feet of actual point of chainsaw/soil auger operation.

Burning or Blasting: The CO may issue a permit for any burning or blasting, after consultation with the fire management officer if conducted during the designated fire season. Issuance will be dependent upon the current fire danger and need for the requested action. It is anticipated that no on site burning will be conducted due to the potential of exotic species introduction. If burning or blasting is permitted, a minimum of a 75 gallon slip on water pump will be available on site in the event of fire. One condition of any permit issued will be the notification of the fire management office (360-565-3120) of any such actions on the day before they will occur.

Spark Arresters: All internal combustion power equipment used by the Contractor on the project shall be equipped with an approved spark arrester as set forth in the publication of the USDA Forest Service, entitled "Standard 5100-1a for Spark Arresters for Internal Combustion Engines" as amended under date of July 1970, and be listed in the most recent "Spark Arrester Guide" as having been approved as meeting above standard. They shall be cleaned regularly and maintained in satisfactory working condition. The following are exempt from the requirements of the rule: (a) turbo-charged internal combustion engines in which 100 percent of the exhaust gasses pass through a turbo-charger; (b) engines of passenger carrying vehicles and light trucks equipped with a muffler with baffles that are kept in good repair (glass packs are not an approved muffler for wildland work); (c) water pumping equipment used in firefighting.

Spark arrester shall comply with all State and Federal fire requirements.

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Lunch and Warming Fires: Cooking and warming fires will not be permitted.

Hand Tools: The Contractor shall furnish one size "O" shovel (38 1/2 inch handle minimum) or larger, one axe or pulaski with 26 inch handle or larger, one 5 BC or larger rated pressurized fire extinguisher for each truck, each contractor vehicle, each tractor, and each grader. For each welder he shall furnish one size "O" shovel and one backpack pump. For each gasoline power tool (power saw, soil auger, etc.), one shovel (38 1/2 inch handle minimum) and one 8 ounce or larger BC rated chemical-pressurized fire extinguisher.

Contractor shall also furnish any other equipment called for elsewhere in the contract. The shovel and fire extinguisher will be located within 10 feet of the operating chainsaw/power auger.

Storage and Parking Areas: Equipment service area, parking area, and gas and oil drum storage areas will be cleared of all flammable material for a radius of at least fifty feet. These areas must be approved in writing by the CO in advance of use. Small stationary engine sites shall be cleared of flammable material for a radius of at least five feet from such engine.

Fire Tool Box: A red fire toolbox will be required to be on each work site while work is being performed. This fire toolbox will contain sufficient tools to equip all persons engaged in Contractor's operation. Fire tools shall be used only for suppressing wildfires. Tools shall be stored in fireboxes provided by the Contractor and readily available to employees. Each toolbox shall be marked "Tools for Fire Only". The CO will inspect the fire toolbox and then seal the box with a tamper seal that will not preclude access to the tools in an emergency.

III. Contractor's Responsibility When Fire Occurs Within the Contract Project Area

- A. Immediately notify the Park dispatch center (360-565-3115) of any fire within the project site.
- B. Immediately send contract crew with tools and equipment to the fire and take initial-attack suppression action on the fire, if it can be done safely. If the fire is beyond the crew's capability, evacuate the area.
- C. Designate a contract person to serve as on scene incident commander (IC) to insure that personnel remain safe. The IC directs initial attack response and serves as primary contact by phone or radio with dispatcher, until relieved by Park personnel who will assume the role of IC and initial attack firefighters.

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